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DISEASES CAUSED BY BACTERIA AND FUNGI

THÖRNE, H. (1957). Fortsatta undersökningar angående vissa förhållanden hos stafylococcer isolerade från nötkreatur. [Further studies on staphylococci isolated from cattle.]—*Nord. VetMed.* 9, 521-542. [In Swedish. English and German summaries. Abst. from English summary.] **1650**

Continuing his study of staphylococci isolated from cattle with mastitis [see also *V.B.* 27, 1631], T. found that of 1418 such strains, 290 belonged to Type I (K+M+C+, i.e., they were positive to the coagulase test, mannite fermentation, and the CAMP-test), 106 to Type II (K+M+C-), 186 to Type III (K+M-C-) and 825 to Type IV (K-M-C-). Five strains were K+M-C+ and 6 K-M+C-. The haemolytic properties of 453 strains were examined. Of 162 strains in Type I 154 produced both α and β -lysin, and 8 β -lysin only; of 69 in Type II 62 produced α -lysin and 7 showed atypical haemolysis; of 65 in Type III 38 produced α -lysin, 7 were atypical and 20 were non-haemolytic; and of 146 in Type IV 2 produced α -lysin, 29 were atypical and 115 were non-haemolytic.

In Type I 140 out of 143 strains fermented lactose, in Type II 67 out of 69, in Type III 38 out of 61, and in Type IV 70 out of 110. Change of colour in the Hotis test was obtained in 32% of strains in Type I, 21% in Type II, 12% in Type III, and 11% in Type IV.

I/d inoculation of 48 strains into cattle revealed that pathogenicity decreased according to type, Type I being the most and Type IV the least pathogenic.—M.G.G.

MACADAM, I. (1958). The pathology and bacteriology of bovine mastitis in relation to cell counts. —*J. comp. Path.* 68, 106-111. [Author's conclusions slightly modified.] **1651**

94 quarters from 24 slaughtered cows in their fifth or later lactation were examined. Variations in type and severity of mastitis lesions were found to occur in different parts of the same

quarter. Total cell counts were generally directly related to the extent of pathological changes. Polymorph proportions as a rule exceeded 70% in milk from acutely inflamed quarters and were below 40% during involution in the absence of acute mastitis. The quarters infected with *C. pyogenes* and *Str. agalactiae* showed in general about twice the amount of pathological change present in those infected with *Str. uberis* and coagulase-positive *Staph. aureus*, and about four times the amount shown by sterile quarters and those infected with coagulase-negative *Staph. aureus*.

YAMAGIWA, S., ONO, T., UEMURA, T. & IDA, T. (1957). Histopathological studies on bovine mammary gland. I. Histological findings of mastitis.—*Jap. J. vet. Res.* 5, 141-165. [In English.] **1652**

A careful histological examination was made of the mammary glands from 30 cases of bovine mastitis obtained from the abattoir. Bacteriological examinations were not made, and therefore the lesions found could not be related to specific aetiological agents. However, consideration of all the available material suggested the existence of two essentially different degrees of pathological change, called by the authors (a) Mastitis circumspecta, characterized by microscopic inflammatory foci involving alveoli with some inflammatory reaction of the interstitial tissue, but without involvement of the ducts; (b) Mastitis diffusa, in which there were obvious inflammatory changes in both the lobular tissue and the ducts. Mastitis circumspecta was found in mammary glands that were not recognized clinically as being abnormal, but all the cases of mastitis diffusa were diagnosed clinically as mastitis. There are 35 excellent photomicrographs to support the text.—I. H. PATTISON.

BRACEWELL, C. D. & PATTISON, I. H. (1958). Experimental streptococcal mastitis. XII. Further immunological studies in the cow.—

J. comp. Path. 68, 121-131. [Authors' conclusions modified.]

1653

An attempt was made to test a *Str. agalactiae* vaccine under "field conditions" by exposing 19 vaccinated and 15 non-vaccinated cows for 58 weeks to the risk of infection with the same strain of *Str. agalactiae* as was used in the vaccine. The methods of spreading *Str. agalactiae* through the herd were (a) for the first 20 weeks, until the end of the first lactations, by using experimentally infected donor cows (b) for 32 weeks, after the dry periods, by dipping the teats of all cows three times each week in a culture of *Str. agalactiae*. *Str. agalactiae* infections occurred in two vaccinated cows (two quarters) and in seven non-vaccinated cows (13 quarters). The practical value of *Str. agalactiae* vaccination was discussed on the basis of the results in this and earlier experiments; it was concluded that the measurable protection given by this method of vaccination was too small to be likely to play a significant role in controlling *Str. agalactiae* mastitis in the field.

I. NILSSON, G. (1957). Studies concerning the reducing properties of milk. The reducing systems in milk obtained under aseptic conditions from healthy and mastitic cows.—*K. LantbrHögsk. Ann.* 23, 73-122. [In English.]

1654

II. NILSSON, G. (1957). Studies concerning the reducing properties of milk. The reducing properties of mastitis organisms.—*Ibid.* 123-130. [In English.]

1655

III. NILSSON, G. (1957). Studies concerning the reducing properties of milk. The oxidation-reduction potential of normal and mastitis milk and the influence of some factors upon this potential.—*Ibid.* 131-141. [In English.]

1656

IV. NILSSON, G. (1957). Studies concerning the reducing properties of milk. The possibilities of analyzing bulk milk for contamination with mastitis milk.—*Ibid.* 159-174. [In English. Absts. from author's summaries.]

1657

I. The difference between the reducing properties of healthy and mastitis milk was shown to be due to the presence in mastitis milk of a slightly higher concentration of xanthine oxidase, and also of substances which yield this enzyme, and precursors of such substances, in such amounts as to make a fall in potential possible. These substances and their precursors on oxidation form uric acid. The influence of the leucocytes upon the reducing properties of

mastitis milk was investigated. The leucocytes themselves were found to have no reducing capacity. It is suggested, however, that they may indirectly affect the redox system of mastitis milk by their content of nucleic acid.

II. The reducing capacity in milk of 10 different pure cultures of bacteria causing mastitis was studied. Of the mastitis streptococci, only *Str. uberis* caused a slight fall in potential. *Corynebact. pyogenes* had no reducing capacity. The two strains of *Staph. aureus* each had a relatively weak, and two strains of *Esch. coli* a strong, reducing capacity. Thus in *Esch. coli* mastitis, and even in staphylococcal mastitis when the organism occurs in great numbers, the possibility must be borne in mind that the reducing capacity of the milk at 37°C. may be partly of bacterial origin.

III. It was found that all cases of mastitis diagnosed by clinical examination were confirmed by laboratory analyses of the milk carried out at about the same time, the analyses showing fall in potential, high leucocyte content, high catalase index and reduction of resazurin to resorufin.

IV. Enzymic reduction through the xanthine oxidase system is only slightly affected, whilst reduction due to bacterial activity is checked, by addition of toluol. Using the Scharlanger methylene blue test with the addition of toluol to the milk to prevent bacterial activity it may be possible to determine whether the milk comes from healthy or mastitis infected herds. The resazurin test applied after controlling bacterial activity by addition of toluol holds great promise as a simple method of detecting contamination of bulk milk with mastitis milk.

ULLBERG, S., HANSSON, E. & FUNKE, H. (1958). Distribution of penicillin in mastitic udders following intramammary injection—an autoradiographic study.—*Amer. J. vet. Res.* 19, 84-92. [Authors' summary modified.]

The distribution of penicillin following intramammary inj. into udders with mastitis was studied using S³⁵-labelled penicillin and autoradiography. In the diseased udders the drug was usually unevenly distributed, with regions of varying sizes containing little or none. Administration either as an oil or aqueous solution gave essentially the same result. The accessibility of the tissues to the drug depended mainly upon clear passage in the milk ducts, diffusion through the tissues being of minor importance. It was postulated that failure of penicillin treatment of mastitis often results from inability of the drug to reach the diseased areas.

DAVIES, M. E., HODGMAN, S. F. J. & SKULSKI, G. (1957). An outbreak of anthrax in a hound kennel.—*Vet. Rec.* **69**, 775. 1659

In a kennel of 80 foxhounds 12 developed anthrax. As these 12 were the only dogs in the kennel to have eaten raw meat from a cow, it was believed that this cow was the source of infection, although *B. anthracis* had not been found in smears from its spleen and blood. The most striking clinical feature was swelling of the face and throat. One puppy died from asphyxia, but the others recovered after treatment with an initial dose of 1,000,000 units of penicillin, followed by 500,000 units daily for 5 days. *B. anthracis* was recovered from the organs of the dead puppy.—M.G.G.

PEARSON, J. K. L. & CONN, E. (1957). Anthrax in dogs.—*Vet. Rec.* **69**, 893. 1660

In Northern Ireland 3 foxhounds died 4 days after eating raw beef from a knackery. The only symptoms observed were dullness and depression. *Bacillus anthracis* was recovered P.M. Examination of bovine carcasses at the knackery for a period of 4 months revealed anthrax in 5 out of 499 carcasses within the first 3 weeks, but no further case was found in the next 2,000 examined.—M.G.G.

JACKSON, F. C., WRIGHT, G. G. & ARMSTRONG, J. (1957). Immunization of cattle against experimental anthrax with alum-precipitated protective antigen or spore vaccine.—*Amer. J. vet. Res.* **18**, 771-777. [Authors' summary modified.] 1661

Two s/c injections of alum-precipitated antigen 30 days apart produced immunity to anthrax in cattle. The resistance was effective one month later, had declined somewhat after $3\frac{1}{2}$ months, and was barely detectable after 7 months. A challenge dose of 1.5×10^8 spores, given by mouth, was fatal to 74% of the controls. Animals that died had a characteristic lesion in the small intestine and adjacent mesenteric lymph nodes. This lesion appeared to be the portal of entry for the generalized infection. A non-encapsulated living spore vaccine was tested also. All of 6 animals survived challenge 3 months after immunization, but all showed evidence of infection. Characteristics of the disease in normal and partially immune animals are discussed and the P.M. findings are presented.

KOLESOV, S. G. (1957). [Results of single inoculation of farm animals against anthrax with Tsenkovskii's second vaccine.]—*Veterinariya, Moscow* **34**, No. 7, pp. 48-51. [In Russian.] 1662

Because the virulence of Tsenkovskii's

second vaccine has declined since its introduction in 1883, it may now be used alone as a single inoculation for the protection of livestock from anthrax. Between 1943 & 1954 fourteen million animals were inoculated with the vaccine in the U.S.S.R. (63,000 horses, 828,000 cattle, 13 million sheep, 13,000 goats and 23,000 pigs). The proportion of complications and deaths after inoculation was stated to be low.—R.M.

STAMATIN, N. & CRISTESCU, P. (1958). Titrage du sérum anticharbonneux sur le hamster doré. [Titration of anti-anthrax serum in hamsters.]—*Ann. Inst. Pasteur* **94**, 243-246. [English summary modified.] 1663

Hamsters were highly sensitive to anthrax, and a thousand times more sensitive than g.pigs to the Tsenkovski strain: in one of the experiments, the minimal lethal dilution of the same suspension of spores was 1:50,000 for g.pigs and 1:50,000,000 for hamsters. Despite this high sensitivity to infection, hamsters were also very responsive to serum antibodies: doses of 4 to 6 ml. of immune sera scarcely protected g.pigs against 4 to 5 m.l.d., whereas hamsters were protected by doses of 0.25 to 0.50 ml. of immune serum against 50 m.l.d. of a 48-hour broth culture of *Bacillus anthracis*. Hamsters seem therefore to be excellent animals for titration of anthrax immune sera.

TEMPEST, D. W. & SMITH, H. (1957). The effect of metabolite analogues on growth of *Bacillus anthracis* in the guinea pig and on the formation of virulence-determining factors. — *J. gen. Microbiol.* **17**, 739-749. [Authors' summary slightly modified.] 1664

Several metabolite analogues were tested for their effect on the growth of *B. anthracis* and its ability to synthesize toxin and capsular material during the terminal bacteraemic stage of anthrax in the g.pig. 8-Azaguanine, 8-azaxanthine and to a lesser degree, ethionine, α -amino-*n*-butyric acid and β -fluorophenylalanine inhibited the *in vivo* growth of *B. anthracis*, whilst 2-thiouracil and pyridine 3-sulphonic acid selectively inhibited toxin production. Inhibition of capsule formation was at no time convincingly demonstrated. The annulment of these inhibitions by mixture of the analogues with appropriate metabolites gives evidence that hypoxanthine, adenine, methionine, alanine, phenylalanine and tryptophan are involved in growth *in vivo* and pyrimidines and nicotinamide in toxin synthesis.

MCEARLEAN, B. A. & DINEEN, C. (1957). Fatal encephalitis in piglets due to a pseudo-anthrax organism.—*Irish vet. J.* **11**, 204-205. 1665

One of a litter of 7 piglets aged 3 weeks

developed nervous symptoms and died. Four days later two other piglets developed nervous symptoms and a temp. of 101°–102°F. and died after two and three days respectively. The remaining pigs were still healthy five weeks later. P.M. examination of one of the carcasses revealed no gross lesions except turbidity of the cerebrospinal fluid. An organism was isolated from the liver, brain and kidney. Mice injected i/p with a suspension of the organism died in 5–17 hours; a rabbit, injected s/c, died within 18 hours; a g.pig showed dullness and an ocular discharge for 3 days and then gradually recovered. The organism was identified as one of the pseudo-anthrax group by its cultural, morphological and biochemical characters.—T.E.G.R.

ANON. (1957). [Eradication of tuberculosis in farm animals—a task of great importance.]—*Veterinariya, Moscow* 34, No. 7. pp. 3-9. [In Russian.] **1666**

On the 1st January 1957 the average incidence of bovine TB. in the U.S.S.R. was 0·1%. On collective farms the incidence was 0·5% and on state farms it was 0·75%. In 1941 the average incidence was 1·5% of all cattle. Of 82 oblasts and republics in the R.S.F.S.R., state farms in 26 of them were free from bovine TB., while in another 16 the proportion of infected farms did not exceed 15%. Latvia, Estonia, Georgia and Kirgizia showed no reduction in bovine TB. Two reasons for this were failure to test more than about half the cattle population, and reluctance to slaughter high-yielding reactors. Control measures and ultimate eradication were discussed.—R.M.

SIKORA, A. (1957). Tuberkulose des Schweines—Eine Teilstudie der Rinder-Tbc-Bekämpfung. [TB. of bovine origin in pigs.]—*Mh. VetMed.* 12, 529-531. **1667**

Of 4053 cases of TB. in slaughter pigs (out of a total of 20,128 pigs), 97% were diagnosed macroscopically as of the bovine type, and 3% of the avian type. 95% of those with the bovine type had lesions in the gastro-intestinal tract, indicating unpasteurized skim milk as the source of infection. Moreover, of 254 pigs from attested dairy farms, which purchased skim milk for feeding pigs, 26% had bovine type TB. of the gastro-intestinal tract. It is recommended that pigs on attested dairy farms should not be given unpasteurized skim milk, and that such pigs should undergo the tuberculin test. Reactors would be slaughtered.—M.G.G.

GAVEZ, E. (1957). Prilog histoteritorijalnoj citologiji intraheparnih sarkoidnih (avijarnih) tuberkuloza svinje sa specijalnim obzirom na

Langhans-ove gigantocite. [Avian-type TB. of the liver in pigs with special reference to giant cells.]—*Veterinaria, Sarajevo* 6, 360-370. [In Croat. English and German summaries.] **1668**

Liver lesions in 10 pigs, caused by avian-type tubercle bacilli were studied macroscopically and histologically. Reactions were seen within and around the lobules. In the interlobular tissue there was a tendency to fibrosis and a few, comparatively small, atypical giant cells were present, whereas large numbers of typical giant cells were present in the lobular tissue. Factors favouring and inhibiting the formation of giant cells were discussed.—E.G.

MARKS, J. (1958). The demonstration of tuberculin hypersensitivity *in vitro*.—*J. Path. Bact.* 75, 39-53. [Author's summary copied verbatim.] **1669**

Tuberculin reduces the motility of sensitised macrophages and polymorphs *in vitro*, but has no direct lethal effect on them. However, in certain adverse cultural conditions, sensitised cells exposed to tuberculin may die as a result of being confined to the explant. It is suggested that the immobilisation of leucocytes may be important *in vivo* in building up hypersensitivity reactions to tuberculin. Fowl plasma is less favourable than homologous plasma for the culture of guinea-pig tissue and its use may lead to artefacts. The addition of purified protein derivative (P.P.D.) to dispersed cultures of sensitised cells does not reduce their glucose consumption and has only a slight effect on their phagocytic and dehydrogenase activities.

POLYAKOVA, O. A. (1957). [Fluorescent microscopy in the diagnosis of tuberculosis and paratuberculosis.]—*Veterinariya, Moscow* 34, No. 6. pp. 62-66. [In Russian.] **1670**

Small-scale tests indicated that fluorescence microscopy was quicker and more reliable than the Ziehl-Neelsen method for examining smears of organs for avian TB. and presumably also for Johne's disease. The light source was ultra-violet filtered through copper sulphate soln. Auramin and fuchsin were used as stains.—R.M.

MC EWEN, A. D. & SAMUEL, I. MCA. (1958). The intravenous inoculation of sheep with graded doses of *Mycobacterium johnei*.—*J. comp. Path.* 68, 45-53. [Authors' conclusions modified.] **1671**

Four groups of 16 sheep six months old, were inoculated i/v with graded doses of a culture of a bovine strain of Johne's bacillus. There was an uninoculated group of 17 sheep. From one to two years after inoculation the sheep

were slaughtered and selected lymph nodes cultured for evidence of infection with *M. johnei*. A dose of 2 mg. infected 14 of 16 sheep, two becoming clinical cases. Dilution of 10^{-2} and 10^{-4} each infected 12 of 16 sheep; a dilution of 10^{-6} infected 5 of 16 sheep; none of the sheep developed a clinical disease. Two clinical cases occurred in a pen that housed three non-inoculated sheep: the latter were found infected at slaughter. None of the remaining 14 controls kept in contact with inoculated animals that showed no clinical disease became infected. It was believed that the three non-inoculated but infected sheep acquired infection, when about 20 months old, from the bacilli excreted in the faeces of the two clinical cases. A serological test using as antigen sheep r.b.c. sensitized with P.P.D. tuberculin detected few infected sheep and as used was of little or no diagnostic value.

JONES, W. D., JR. (1957). Simple method for maintaining stock cultures of mycobacterium species.—*Amer. J. clin. Path.* 27, 363-364.

1672

The method consists in placing 2 ml. of tap water in a flat-bottomed 2-drachm vial provided with a screw cap. The cap is screwed on and the vial is autoclaved at 120°C . for 15 min. A suspension of the bacteria is prepared by emulsifying 5 or 6 colonies of the culture in the sterile water. The vial is then tightly capped and stored in an upright position at -16° to -20°C . Stock cultures can be maintained for long periods without frequent transfers.—T.E.G.R.

BICKS, V. A. (1957). Infection of laboratory mice with *Corynebacterium murium*.—*Aust. J. Sci.* 20, 20-22.

1673

This reports the isolation of *Corynebact. murium* from laboratory mice in Australia. The cultural characteristics of the strains are described.—K. G. JOHNSTON.

ČALIĆ, Z. (1957). [*Erysipelothrix rhusiopathiae* infection in sheep in Serbia.]—*Acta vet., Belgrade* 7, 101-103. [In Serbian. German summary.]

1674

E. rhusiopathiae septicaemia was diagnosed in five dead sheep examined at the Belgrade Veterinary Institute. Massive infestation with helminths was thought to have enhanced their susceptibility.—E.G.

NEHER, G. M., SWENSON, C. B., DOYLE, L. P. & SIKES, D. (1958). The incidence of arthritis in swine following vaccination for swine erysipelas.—*Amer. J. vet. Res.* 19, 5-14. [Authors' summary modified.]

1675

66 pigs were vaccinated against swine erysipelas (53 with aluminium hydroxide adsorbed vaccine, 13 with desiccated live culture and serum), and there were 30 unvaccinated controls. Challenges were made at various times 6-16 weeks after vaccination. Intravenous challenge was superior to exposure by contact or skin scarification for demonstrating the degree of protection afforded. Although vaccination did not prevent the establishment of erysipelas following challenge, it did prevent high mortality—which occurred in the controls. Essentially, there was no difference in effectiveness; some protection was evident for at least four months following vaccination with either product. It was concluded that vaccination will not prevent arthritis, since there was a higher incidence in vaccinated pigs. Of the 50 protected animals which were exposed i/v, 31 had rheumatoid arthritis two months after challenge, and only one of 7 surviving controls developed chronic arthritis. Sensitization may be an important aetiological factor in arthritis, particularly since marked anaphylactic reactions were evident in vaccinated pigs at the time of injection, in contrast to negative or slight allergic responses in the controls. The role of hypersensitivity and the production of arthritis without other manifestations of acute erysipelas were discussed in conjunction with naturally occurring arthritis in pigs never visibly ill with acute septicaemic erysipelas.

WAWRZKIEWICZ, J. (1957). Badania nad występowaniem fazy negatywnej u koni produkujących surowicę p-w różycową. [The "negative" phase in horses used for production of swine erysipelas serum.]—*Méd. vét., Varsovie* 13, 654-656. [In Polish. English and Russian summaries.]

1676

Agglutination tests on sera of two groups of (6 and 9) horses hyperimmunized against *E. rhusiopathiae* revealed a "negative" phase in all cases following i/v or s/c injections of 24 hour culture of the organism. The lowest titre was found between 3-6 and sometimes 12 hours after the injection; the pre-injection level was regained after 24 to 48 hours.—M. GITTER.

MAMEDOV, A. A. (1957). [Listerella infection of cattle in Azerbaijan.]—*Veterinariya, Moscow* 34, No. 7, pp. 38-41. [In Russian.]

1677

Infection was manifested by nervous symptoms (paralysis) and abortion in adult cattle. *Erysipelothrix (Listeria) monocytogenes* was isolated from ticks collected from cattle on affected farms. The disease did not occur on farms which carried out anti-tick measures. Prompt treatment

with streptomycin (500,000 units in 3 ml. saline every 6 hours for 3-7 days) gave good results.

—R.M.

KOZNOK, N. A. & BARSUKOV, G. F. (1957). [Listeria infection in pigs.]—*Veterinariya, Moscow* 34, No. 5. pp. 23-24. [In Russian.]

1678

An outbreak amongst pigs 1-3 months old on one farm caused 90 deaths in 2 years. Apart from the usual signs of septicaemia and involvement of the nervous system, oedema of the eyelids was regarded as characteristic for the disease. The most effective treatment was streptomycin, 100,000-200,000 units twice daily by i/m inj. for from 2-5 days. 46 out of 49 affected piglets recovered after this treatment.—R.M.

HESSEN, L. (1957). Listeriose hos gris. [Listeria infection in piglets.]—*Nord. VetMed.* 9, 951-958. [In Norwegian. English and German summaries. English summary modified.]

1679

Four of a litter of 13 piglets became ill and 3 died after one day's illness. Treatment with sulphadimidine intraperitoneally showed good effect. There were many necrotic foci in the liver, similar to those seen in artificially infected mice. *Erysipelothrix (Listeria) monocytogenes* was isolated from organs and blood. The source of infection was probably sheep, because a sheep on the farm had died from "listeria encephalitis" about 14 days before the piglets were born. Strains of listeria isolated from the piglets and from this sheep were biochemically identical. Serologically both strains belonged to Paterson's Type 4.

AMITROV, V. K. (1957). [Pasteurellosis in horses.]—*Veterinariya, Moscow* 34, No. 9. pp. 50-52. [In Russian.]

1680

Ten out of 89 horses on a collective farm developed haemorrhagic septicaemia and died. *Past. septica* was isolated from organs of the dead horses.—R.M.

BAIN, R. V. S. (1957). The problem of haemorrhagic septicaemia in cattle.—*Ceylon vet. J.* 5, 2-7.

1681

The aetiology, pathogenesis and epidemiology of the disease are discussed. The causal organism is *Pasteurella septica* Type I (Roberts). In susceptible cattle and buffaloes the disease is precipitated by stress. One of the first symptoms is profuse salivation; pasteurella are abundant in the saliva and can survive in the open for 24-48 hours; susceptible animals become infected from the contaminated environment. An outbreak reaches a peak with the infection of all susceptible animals and then gradually declines. Natural

active immunity in about 10% of the cattle population has been observed in most Asian countries. This is tentatively attributed to the existence of a Type I strain of low virulence causing a benign immunizing infection. It has not been possible to demonstrate bactericidal properties in the serum of immune animals. The relative merits of vaccines in use are reviewed.—T.E.G.R.

HAWLEY, G. E. (1957). Control of the shipping fever complex with terramycin in feedlot rations.—*Vet. Med.* 52, 481-484.

1682

After a prolonged train journey 13,162 cattle were fed terramycin, 0.25-2 g. per head per day for 3-8 days; 16,936 were kept as controls. Of the treated animals 169 required further treatment and 21 died. In the control group 87 died and 936 required treatment.—T.E.G.R.

WEIL, A. J., RIGOPoulos, N. & WALUSCHKO, A. (1957). Combinations of two antibiotics in the therapy of the experimental infection of mice with *Pasteurella multocida*.—*Antibiot. & Chemother.* 7, 593-603. [Spanish summary pp. 620-621. Authors' summary modified.]

1683

Mice infected with *Pasteurella septica* were treated with single injections of combinations of penicillin plus tetracycline, penicillin plus erythromycin, and erythromycin plus tetracycline at concentrations less than maximal activity. Under these conditions, the effect of the combinations may be higher than that of the single components (additive), equal to that of the most active component (indifferent), or less than that of the most active component (interferent). Thus, activity depended not only on the nature of the individual component antibiotics, but also on the concentrations employed. The implications of these and of previous data with a variety of micro-organisms and of combinations of antibiotics are discussed.

LONDON, S. A. & YAW, K. E. (1957). Antigenic analysis of dissociants and serological types of *Pasteurella multocida*.—*Canad. J. Microbiol.* 3, 1021-1029.

1684

Using a variety of immunological methods previous workers have been able to separate the aetiological agent of haemorrhagic septicaemia, *Past. septica*, into serological types and also describe a definite dissociation pattern. Such information suggests that *Past. septica* for particular hosts might be dependent on the presence and concentration of the type specific polysaccharide capsule. The present study demonstrated that two colonial variants of a Type 1 strain were qualitatively identical in antigenic structure but differed quantitatively with regard to one anti-

gen. It was also shown that while some similarity exists between somatic antigens of three type strains, antigenic differences can be demonstrated, which may represent differences in the substances comprising the capsule of the micro-organism.—R. V. L. WALKER.

QURESHI, S. H. (1957). The incidence of infectious enteritis (colibacillosis) in chickens in West Pakistan.—*Agric. Pakist.* **8**, 48-52. **1685**

Esch. coli was believed to be responsible for acute fatal enteritis which occurred in two flocks after some young birds had been inoculated with Newcastle disease vaccine. The disease was reproduced by inoculation of organ suspensions from affected birds. *Esch. coli* was isolated from 207 out of 378 chicks with enteritis.—R.M.

GIBSON, E. A. (1957). An outbreak of *Salmonella dublin* infection in goats.—*Vet. Rec.* **69**, 1026-1028. [Author's summary modified.] **1686**

An outbreak of *S. dublin* infection in goats is described. The source of infection was apparently a dairy herd on the same farm. It is suggested that goats may differ from cattle in their serological response to *S. dublin* infection.

GORZHKOVSKAYA, S. I. & KALUGIN, V. I. (1957). [Mechanism of the intra-uterine transmission of immunity to paratyphoid in rabbits.]—*Veterinariya, Moscow* **34**, No. 8. pp. 33-39. [In Russian.] **1687**

In pregnant rabbits inoculated with formalized vaccine against calf paratyphoid, agglutinins traversed the placenta to the foetus. The agglutination titre of serum of foetal and newborn rabbits was nearly as high as that of the dam; it persisted in young rabbits for at least three months. The best route for immunizing pregnant rabbits was intramuscular, using a dose of 1 ml./kg. body wt. but not exceeding 2 ml. Small and medium doses of the vaccine did not provoke active phagocytosis in rabbits; large doses provoked a weakly positive phagocytic reaction.—R.M.

SOKOLOVA, V. I. (1957). [Secondary paratyphoid infection in sheep.]—*Veterinariya, Moscow* **34**, No. 7. pp. 52-54. [In Russian.] **1688**

Acute fascioliasis in a flock was complicated by secondary *S. typhi-murium* infection. Affected sheep developed septicaemia which terminated fatally after 7-15 days. The results of serum agglutination tests are given.—R.M.

KATIĆ, R., PUHAČ, I., JANKOVIĆ, B., SIMON-OVIĆ, B., HRGOVIĆ, N. & BANDUR, B. (1957).

[Effect of light on serum protein concentration in rabbits injected with *Salmonella typhi-murium* antigen.]—*Acta vet., Belgrade* **7**, 65-68. [In Serbian. English summary.] **1689**

Blood samples from two groups each of 8 rabbits, one kept in daylight, the other in darkness, were examined electrophoretically before and after inoculation with *Salmonella typhi-murium* antigen. The γ -globulin content in samples from immunized rabbits kept in daylight was markedly higher than that of rabbits kept in darkness. The effect of light on α_1 , α_2 and β globulin fractions in normal and immune serum could not be ascertained because individual variations within these fractions were too wide.

—E.G.

GARREN, H. W. (1957). Attempt to stimulate lymphatic gland changes of fowl typhoid with adrenal cortex extract.—*Proc. Soc. exp. Biol., N.Y.* **95**, 716-719. **1690**

Adrenal cortex extract given to chicks, 35-39 days old, for 6 days in amounts ranging from 0.25 to 3 ml. daily, significantly reduced the weight of the thymus and the bursa of Fabricius. 2 ml. daily was adequate to cause the weight loss and histological changes seen in the bursa of Fabricius in chickens with fowl typhoid.

—A. ACKROYD.

MÜLLER, J. (1957). Om salmonellainfektioner hos svømmefugle. [Salmonella infections in poultry.]—*Medlemsbl. danske Dyrlegeforen.* **40**, 631-635. [In Danish.] **1691**

30,596 blood samples from ducks, geese, turkeys and fowls from 1,356 flocks in the Danish islands were examined by agglutination tests over a 6-month period in 1956-57. 26.4% of the flocks contained reactors to *S. typhi-murium* and *S. enteritidis* antigens. Of 3,932 unspecified blood samples, probably mostly from ducks, 4.3% were positive to *S. typhi-murium* and 3.7% to *S. enteritidis*. 63.5% of the 169 large flocks (mostly in Funen) contained reactors, as against 21.8% of 1,082 small flocks. The infection was confirmed by bacteriological examination in 41 of 361 reactors from 197 flocks during 11 months, (35 *S. typhi-murium*, 4 *S. enteritidis*, 2 *S. dublin*). Ducks were most often infected. After a severe outbreak of *S. typhi-murium* gastro-enteritis in a farmer and his family, 500 blood samples from the hens on the farm were examined: 17 were positive, and bacteriological examination of 13 of the reactors revealed *S. typhi-murium* in 3; in 2 of these the infection was demonstrable in the ovary, and an unlaid egg from one bird,

after incubation at 37°C. for 4 days, yielded the organism in pure culture from the yolk and white but not from the shell.—F.E.W.

SHAFFER, M. F., MILNER, K. C., CLEMMER, D. L. & BRIDGES, J. F. (1957). Bacteriologic studies of experimental salmonella infections in chicks. II. — *J. infect. Dis.* **100**, 17-31. [Authors' summary modified.] **1692**

Following peroral or intraperitoneal inoculation of varying (often small) numbers of salmonella, chicks were examined bacteriologically. Strains of *S. paratyphi A*, *S. paratyphi B*, *S. typhi-murium*, *S. heidelberg*, *S. paratyphi C*, *S. cholerae-suis*, *S. montevideo*, *S. thompson*, *S. tennessee*, *S. enteritidis*, *S. panama*, *S. pullorum*, *S. anatum*, *S. meleagridis* and *S. give* were used. Infections produced by peroral inoculation of day-old chicks could usually be assigned to one of three general groups characterized by: (1) a course of infection, such as that produced by *S. typhi-murium* or *S. enteritidis*, which included (a) extensive shedding via the cloacal contents within 24 hours and for varying numbers of days thereafter, (b) frequent invasion and localization within tissues such as spleen, liver, and lungs, and (c) occasional or frequent deaths from bacteraemia; (2) regular shedding of the salmonella in the excreta, but less evidence for invasiveness and virtually no lethality (e.g. *S. paratyphi A*); or (3) a marked tendency to invasion and localization in the deeper organs even when enteric proliferation was uncommon, exemplified by *S. paratyphi C* and *S. cholerae-suis* (including the *kunzendorf* variety). The variations in behaviour sometimes appeared to be associated with particular serotypes, but also occurred among individual strains of the same serotype. There was no regular correlation of behaviour pattern with the Kauffmann-White antigenic grouping. Variations in dose between very few and many millions of viable bacilli of the same strain did not appear to affect the results significantly. After intraperitoneal injection, salmonella were often shed via the cloaca within 24 hours; however, some strains required several days to reach this site, while others were rarely found in the excreta. The lethality was sometimes higher after parenteral than after peroral introduction. A rapid and marked increase in refractoriness with increasing age of the chicks was manifest when *S. typhi-murium* was introduced parenterally, as had previously been observed following peroral inoculation [*V.B.* **23**, 2779]. The ability to infect very young chicks by feeding with small numbers of numerous salmonella types, including certain of those considered more or less

strictly adapted to the human host, as well as the characteristics of the resultant disease process make such experimental infections useful for various fundamental and practical studies.

HENDERSON, W., WALKEY, F. L. & MOREHOUSE, G. L. (1958). Furazolidone treatment of experimental pullorum disease in adult chickens.—*Amer. J. vet. Res.* **19**, 196-199. [Authors' summary modified.] **1693**

Furazolidone, when used at 0·011% of the feed, did not materially affect the development of agglutinin titres in adult fowls artificially infected with *Salmonella pullorum*, except possibly during bacteraemia. The treatment did not affect the isolation of the organism.

THAL, E. (1957). Zur Frage der Variabilität der Lysotypen in der Salmonellagruppe. [Observations on variability of lysotypes within the salmonella group.] — *Nord. VetMed.* **9**, 831-838. [In German, English and Swedish summaries. English summary modified.] **1694**

Direct and indirect phage typing of strains of *S. montevideo* from human beings and poultry showed that one lysotype was involved. One shipment of meat meal from South America contained several different phage types of *S. montevideo*. The specificity of 0-1 salmonella phage was tested on a total of 8,238 strains of Enterobacteriaceae of which 2,855 belonged to the salmonella group. Eleven of the salmonella strains were 0-1 resistant and 23 of the non-salmonella strains were 0-1 positive. Inhibition tests with antiphage serum and cross-infection experiments showed that four of the six 0-1 resistant salmonella strains examined were carriers of phage serologically related to 0-1 phage. The presence of a phage serologically related to 0-1 phage could not be demonstrated in the six lysogenic, 0-1 susceptible salmonella strains examined for comparison. Infection of a salmonella strain by a phage which shares "partial antigens" with the 0-1 phage results in inhibition of the 0-1 phage reaction. Partial antigens from serologically related phages can "immunize" against the lytic effect of a phage.

BRUNER, D. W. (1957). The preparation and use of a polyvalent *Salmonella* antiserum.—*Cornell Vet.* **47**, 491-497. [Author's summary modified.] **1695**

A highly selective polyvalent *Salmonella* antiserum was prepared by injecting a rabbit with a mixed formolized broth antigen containing the known components of the *Salmonella* antigenic mosaic. B. outlined the techniques used, including the preparation of the antigen.

MINGLE, C. K. (1957). State-Federal cooperative brucellosis eradication program.—*Proc. 60th Ann. Meet. U.S. live Stk sanit. Ass., Chicago, 1956* pp. 82-88. **1696**

In 1955 and 1956 30,940,000 cattle in the U.S.A. underwent blood tests for brucellosis. In 1954 51% of reactors were slaughtered, in 1955 71%, and in 1956 89%. The percentage of reactors fell from 2·6% in 1954 to 2·2% in 1956, and the percentage of infected herds disclosed by blood testing fell from 14·2% to 13·5%. Five States and 500 counties have been certified free from brucellosis.—M.G.G.

CALDAS, A. D. & MACHADO, L. J. P. (1957). Emprego do leite na execução da prova da fixação em superfície de Castañeda para o diagnóstico da brucelose bovina. [Surface fixation test on milk for the diagnosis of bovine brucellosis.]—*Arch. Inst. biol. (Def. agric. anim.), S. Paulo* **23**, 67-71. [English abst. Abst. modified.] **1697**

The authors applied the surface fixation test described by Ruiz Castañeda [V.B. **24**, 3753] for the diagnosis of bovine brucellosis, using the milk instead of blood serum. Whole milk failed to give satisfactory results. False positive results were caused by the cream. Skim milk, obtained by centrifugation, gave satisfactory results compared with the tube agglutination and surface fixation tests performed with blood serum of infected cows and of uninfected cows. To ensure reliable results with this skim milk technique, no trace of fat must remain in the milk. This test was more sensitive in detecting brucella agglutinins in milk than the ring test.

EHRSAM, H. R. (1957). Einige Untersuchungen über den Bang-Agglutinationstiter frisch entnommener Blutproben von Tieren der Rindergattung. [Brucella agglutination titre of freshly collected blood from cattle.]—*Schweiz. Arch. Tierheilk.* **99**, 528-532. [English, French and Italian summaries.] **1698**

Blood samples from 223 cattle were tested for brucella agglutinins 2-4 hours after collection, and after storage for 24 hours in the ice-chest. In 131 samples the titre altered during storage; in 23 it rose by 1 to 3 dilutions, and in 108 it sank by 1 to 6 dilutions. In 38 the change in titre permitted a different interpretation of the agglutination test. Bull sera in particular showed marked fluctuations. Of 30 sera from bulls in uninfected herds, 7 were positive when a few hours old, but all were negative after storage for 24 hours. It is considered that these were non-specific reactions, and that sera with posi-

tive titres to the slow serum agglutination test should also undergo the rapid agglutination test. Fresh blood samples should be stored for 24 hours in the ice-chest before testing.—M.G.G.

HUNTER, C. A. & BURDORFF, R. (1958). Flocculation tests for brucellosis in milk.—*Publ. Hlth Lab.* **16**, 14-17. [Abst. from authors' discussion.] **1699**

A rapid method for the separation of whey, without fat, from whole milk was presented. The flocculation tests used for blood were successfully adapted for whey. In tests on over 1,000 milk samples the results compared favourably with those of the milk ring test.

ANCZYKOWSKI, F. (1957). W sprawie standaryzacji barwionej zawiesiny *Br. abortus* do aglutynacji. I. Wybór szczepu. [Standardization of stained suspensions of *Brucella abortus*. I. Selection of strain.]—*Méd. vét., Varsovie* **13**, 590-591. [In Polish.] **1700**

Out of 82 strains, 4 of which were received from abroad, the author selected Strain 19, obtained through FAO in 1947, as the most suitable strain for the production of standardized suspension of *Br. abortus* in Poland.—M. GITTER.

GREATOREX, J. C. (1958). Changes in the blood picture of calves following vaccination with *Brucella abortus* (Strain 19) vaccine.—*J. comp. Path.* **68**, 36-44. [Author's summary modified.] **1701**

The changes in the blood picture of calves of 4 to 8 months of age following vaccination with Strain 19 vaccine were described and compared with those of normal calves of the same age, kept under identical conditions of husbandry. The changes noted were correlated with the rise and fall of agglutination titres. In assessing the results, account was taken of the variations in the blood picture associated with increasing age, puberty and growth of the calves.

PILZ, W. (1957). Unterscheiden sich beim Rind *Brucella-abortus*-Agglutinine nach natürlicher Infektion und Impfung elektrophoretisch? [Can *Br. abortus* agglutinins in cattle serum resulting from natural infection or vaccination be distinguished electrophoretically?]—*Zbl. Bakt. I. (Orig.)* **170**, 103-105. **1702**

Repeated electrophoretic examination of serum from a naturally infected cow and from a calf inoculated with Strain 19, failed to provide a basis for distinguishing two types of agglutinin formation—R.M.

KÄSTLI, P. & HAUSCH, R. (1957). Die Lebensfähigkeit von Bangbakterien in verschiedenen

Käsesorten. [Viability of *Br. abortus* in various cheeses.]—Schweiz. Arch. Tierheilk. 99, 638-644. [In German, English and Italian summaries.] **1703**

In 4 types of cheese which took 50-90 days to mature, *Br. abortus* died at least a month before the cheeses reached maturity. But in cheeses maturing in 15-30 days (Camembert and Münster) the organisms were alive more than a month after maturation of the cheese.—R.M.

ZDRODOWSKI, P., VERSHILOVA, P. & KOTLAROVA, H. (1957). Immunological research on brucellosis and human immunization against this infection by means of an attenuated live vaccine.—*J. infect. Dis.* 101, 1-7. **1704**

A review of work at the "Gameliya" Institute of Epidemiology and Microbiology on spontaneous recovery of animals from brucellosis, and immunization of human beings (shepherds, veterinarians, abattoir workers) with vaccines prepared from *Br. abortus* Strain M or Strain 19. The work described has already been published in the Russian literature.—R.M.

LUTYNSKI, R. (1957). Rozprzestrzenienie zakażeń paleczką *Brucella* u pracowników oborowych mają tków państwowych na terenie województwa krakowskiego. [Incidence of brucellosis in dairy personnel in the Cracow province.]—*Méd. vét., Varsovie* 13, 649-653. [In Polish, English and Russian summaries.] **1705**

In a survey involving 210 people employed in 50 state dairy farms 35% were found infected with brucella (all on farms having a history of infectious abortion in cattle). Several diagnostic methods were used and while the rapid agglutination test proved very useful for field work, the Coombs test revealed most of the positive cases.—M. GITTER.

I. RENOUX, G., ALTON, G. & AMARASINGHE, A. (1957). Études sur la brucellose ovine et caprine. XI. Comparaison, chez la chèvre suédoise, de la valeur immunisante d'un vaccin tué en excipient irrésorbable et de deux vaccins vivants. [Studies on ovine and caprine brucellosis. XI. Tests of killed and living brucellosis vaccines in goats.] — *Arch. Inst. Pasteur Tunis* 34, 3-17. **1706**

II. RENOUX, G. & SACQUET, E. (1957). Etudes sur la brucellose ovine et caprine. XVII. Influences de l'excipient, de la voie d'inoculation et du nombre de brucella sur la valeur immunisante pour les chèvres, du vaccin tué en excipient irrésorbable. [Studies on ovine and caprine brucellosis. XVII. Various fac-

tors influencing the immunising value of killed adjuvant vaccine.] — *Ibid.* 325-346. **1707**

III. SACQUET, E. & RENOUX, G. (1957). Etudes sur la brucellose ovine et caprine. XVIII. Influences de la composition de l'excipient et du point d'inoculation sur la réaction locale au vaccin anti brucellique en excipient irrésorbable. [Studies on ovine and caprine brucellosis. XVIII. Factors influencing local reaction to killed adjuvant vaccine.] — *Ibid.* 347-349. **1708**

I. A formalized saline suspension of *Br. melitensis* was emulsified with mannide monooleate and a light paraffin oil. In experiments on 282 goats 2 ml. of this vaccine injected s/c appeared to give good protection against challenge with *Br. melitensis* after 2 months. It compared favourably with the vaccines described by Renoux in 1950 [*V.B.* 22, 2405] and by Carrère & Quatrefages [*V.B.* 22, 54].

II. Further experiments with formalized *Br. melitensis* Strain 53 H 35 in oily emulsion [see I. above] confirmed its good immunizing properties. Goats were immune $\frac{5}{3}$ months after vaccination. I/m inj. had no advantages over s/c inj. Vaccine prepared with the mineral oil "Drakeol" gave similar results to vaccine prepared with the oil "Mayoline 2214".

III. The authors were unable to find a combination of emulsifying agent and oil which gave less local reaction than the combination originally described. The best site for injection was the inner surface of the thigh.—R.M.

POMANSKAYA, L. A. (1957). [Disinfection of grain and coarse foods infected with *Brucella tularensis*.]—*Veterinariya, Moscow* 34, No. 8, pp. 77-80. [In Russian.] **1709**

At Tula (45 km. south of Moscow) *Br. tularensis* on straw was killed by exposure to direct April sunlight for 42 hours (7 days). The range of temp. in the sun was 10° to 27°C . On oats laid 1 cm. deep in trays, it was killed by $16\frac{1}{2}$ hours exposure in June (temp. range 20° to 31°C .). If the oats were turned over after a $1\frac{1}{2}$ hour exposure, *Br. tularensis* was killed after 6 hours (temp. range 19° to 34°C .). In experiments with ultra-violet light, 25 g. infected oats were placed $1-1\frac{1}{2}$ cm. deep in petri dishes: exposure high enough to damage the grains did not kill all the bacteria. *Br. tularensis* on grains heated in an oven at 70° was killed after 10 min., but heating for 30 min. was considered necessary. Another effective method was soaking in 1:90-1:150 formaldehyde soln. for two hours.—R.M.

FREEMAN, A. (1957). Simplified leptospirosis diagnosis.—*Vet. Med.* 52, 589-591. 1710

An accurate and speedy titre test based on Stoenner's rapid plate method is described which makes leptospirosis serodiagnosis practical for the busy veterinary practitioner. The method requires as equipment only a glass plate and standard droppers. Four drops of normal saline are put in one square and 3 drops in each of the 3 adjacent squares. One drop of serum is added to the four drop square and from this, one drop is transferred to the first 3 drop square and one drop placed in the square below. The process is continued so that the drop below the last 3 drop square has a dilution of 1:640. Antigen is added to the single drops and the agglutination reaction read after 6 min.—A. ACKROYD.

MICHNA, S. W. (1958). Leptospira pomona antibodies in the sera of pigs. A preliminary report.—*Vet. Rec.* 70, 80-81. [Abst. from author's summary.] 1711

In a survey for leptospiral antibodies in pig sera, using *L. icterohaemorrhagiae*, *canicola*, *grippo-typosa*, *hyos*, and *pomona* as antigens, 538 (58·9%) of 914 samples contained specific antibodies. 226 sera (23·63%) reacted with *L. icterohaemorrhagiae* antigen, 70 (7·6%) with *L. pomona* alone, 25 (2·7%) with *L. canicola* alone, 205 with *L. icterohaemorrhagiae* and *L. pomona*, and 12 with *L. pomona* and *L. canicola*. The serological evidence indicated that, in addition to *L. icterohaemorrhagiae* and *canicola*, infection of pigs with *L. pomona* was present in Great Britain. The author appealed for samples of pig blood (3 to 5 ml. of clotted blood), particularly from herds where breeding difficulties have been experienced.

ROTH, E. E. & KNIERIEM, B. B. (1958). The natural occurrence of *Leptospira pomona* in an opossum. A preliminary report.—*J. Amer. vet. med. Ass.* 132, 97-98. [Authors' summary modified.] 1712

L. pomona was isolated from the urine of an opossum trapped in Louisiana.

BAKER, C. E. & GALLIAN, M. J. (1957). Leptospirosis. II. Clinical evaluation of terramycin in natural outbreaks of porcine leptospirosis.—*Vet. Med.* 52, 581-584. 1713

In terramycin fed groups of gestating sows and gilts on 7 farms where there was evidence of infection with *L. pomona*, when compared with an equal number of untreated controls on each farm, there were fewer abortions and the mortality amongst the new-born piglets was less, and their birth weights, weaning weights and health

and viability were greater. The terramycin was fed for 14 days at 500 g. per ton of total ration.

—A. ACKROYD.

COOK, A. R. & THOMPSON, P. E. (1957). The effects of oleandomycin, erythromycin, carbomycin, and penicillin G on *Leptospira icterohaemorrhagiae* in vitro and in experimental animals.—*Antibiot. & Chemother.* 7, 425-434. [Spanish summary p. 455. Authors' summary modified.] 1714

These antibiotics were highly active in preventing the growth of *L. icterohaemorrhagiae* in vitro, and each had demonstrable therapeutic effect against lethal infections in hamsters. Oleandomycin and erythromycin showed particular promise: when given orally relatively late in the disease, small doses protected against death and large doses had apparent curative activity. Penicillin G was highly toxic, either orally or parenterally, throughout these studies. Oleandomycin and erythromycin were tolerated well during the early portion of the work but very poorly during the latter portion. Observations pertaining to this discrepancy and the inordinate toxicity of various antibiotics for hamsters were included.

MOULTON, J. E. & HOWARTH, J. A. (1957). The demonstration of *Leptospira canicola* in hamster kidneys by means of fluorescent antibody.—*Cornell Vet.* 47, 524-532. [Authors' summary modified.] 1715

L. canicola organisms were demonstrated in hamster kidney sections and in smear preparations by means of fluorescent antibody. The reaction between fluorescent antibody and leptospiral antigen was considered specific because it could be inhibited by pretreatment with unlabelled leptospiral immune serum and because it did not occur when non-specific fluorescent antibody conjugates were employed.

SMITH, L. D. (1957). The control of bacillary hemoglobinuria.—*Proc. 60th Ann. Meet. U.S. live Stk sanit. Ass., Chicago, 1956* pp. 135-138. 1716

Clostridium haemolyticum infection of cattle has been known in Montana since 1939. It is restricted to high mountain valleys and from the original focus has spread to 4 other areas of about 1500 square miles in all. It is distributed by contact, by carriers and by contaminated water. The agglutination test has proved to be useless for differentiating infected from uninfected animals. Of 306 unvaccinated cattle in infected areas 26% had agglutinins, and of 112 cattle in uninfected areas 20% had agglutinins.

The positive reactions in uninfected herds are caused by variant, non-virulent strains of *Cl. haemolyticum*. They differ from virulent strains in their ability to ferment maltose and, while sharing a number of antigens with virulent strains, are not serologically identical with them. They are poor producers of toxin, and are much less virulent for lab. animals. Antitoxin tests will not distinguish between carriers and vaccinated animals since, of 8 vaccines tested, 2 stimulated the formation of antitoxin, and a heifer has been found carrying a virulent strain of *Cl. haemolyticum*, although no antitoxin could be demonstrated in the serum. Vaccination every 6 months is necessary to prevent outbreaks, but in one valley many cattle succumb to bacillary haemoglobinuria 3-4 months after vaccination. An association between the disease and liver fluke infestation has been noticed. Eradication of liver flukes may therefore be a possible method of control.—M.G.G.

GIANFORTE, E. M. & BROWN, R., JR. (1958). Isolation of an organism resembling *Clostridium carnis* from mink.—*Amer. J. vet. Res.* **19**, 254-255. [Authors' summary modified.] **1717**

An organism which conformed to descriptions of *Cl. carnis* was isolated from mink from a ranch where a disease resembling leptospirosis was endemic. The bacterium was not an obligate anaerobe, since delicate growth was obtained under aerobic conditions as well. It appeared, therefore, that the organism in question was microaerophilic. Haemolysis was noted under both conditions.

CUBONI, E. (1957). Il bacillo del tetano nella corda di budello o catgut grezzo. [*Clostridium tetani* in raw catgut.]—*Bol. Ist. sieroter. Milano* **36**, 1-14. [English summary.] **1718**

Cl. tetani was demonstrated biologically and bacteriologically in 6 of 857 samples of raw cat-gut.—T.E.G.R.

MORGAN, W. J. BRINLEY., MELROSE, D. R. & STEWART, D. L. (1957). The control of bovine vibriosis.—*Vet. Rec.* **69**, 1429-1432. [Authors' summary modified.] **1719**

Vibrio fetus infection causes temporary infertility in cows and is spread by infected bulls either at service or by artificial insemination. Diagnosis in bulls is most satisfactorily made by recovering the organism from the vaginal mucus of known vibrio-free heifers after insemination. In a herd, diagnosis is made on the herd history and the results of the mucus agglutination test. Wherever possible the organism should be isolated from aborted foetuses or

vaginal mucus samples. The disease in the bull can be successfully treated using antibiotics applied locally to the sheath. Since the disease tends to be self-limiting in the female and is transmitted by infected bulls at coitus or by artificial insemination, the most effective method of control is by artificial insemination on all cows, using semen from known non-infected bulls or infected bulls that have been treated and subsequently proved to be free from infection. The addition of antibiotics to infected semen and the dilution effect do not eliminate completely the possible risk of transmitting the disease.

WHITE, F. H., RISTIC, M. & SANDERS, D. A. (1958). Infectivity of colonial variants of *Vibrio fetus* strains for the chicken embryo.—*Amer. J. vet. Res.* **19**, 205-208. [Authors' summary modified.] **1720**

Smooth and rough colonies of *V. fetus* strains of bovine, ovine, and human origin, and one bovine "saprophytic" vibrio, were infective for chicken embryos. With one exception, the smooth variants were more virulent than the rough. The bovine saprophytic strain had a relatively high degree of infectivity as compared with *V. fetus* strains. The highest mortality occurred in embryos inoculated with the smooth variant of a strain of human origin. *V. fetus* was recovered from both live and dead embryos; but lesions were found only in those which died. The colonial variants recovered from infected embryos were predominantly the same as those inoculated. There was no correlation between the number of viable cells inoculated and embryo mortality.

BOND, J. M. (1957). Characteristics of colonial forms of *Vibrio fetus*.—*Amer. J. vet. Res.* **18**, 449-455. **1721**

Smooth, rough and mucoid variants were found among 10 strains of *V. fetus* and were maintained in pure culture for several months. Cultures were grown on Albini Brucella agar, to which an extra 0.5% agar was added, and incubated in an atmosphere containing 6% oxygen. The colonies were easily distinguishable on staining with crystal violet. The rough type was unstable in physiological saline and showed rapid autoagglutination. In 1:1,000 acriflavine granular clumping occurred in the case of the rough variants, the smooth remained stable and the mucoid formed viscous strings. Smooth and rough forms were catalase positive, H_2S negative and did not grow in deep stab cultures; the mucoid form was catalase negative, H_2S positive and grew in deep stab cultures. All three variants reduced nitrate. The mucoid form was antigenically different from the smooth and the

rough. There was some cross agglutination between the rough and the homologous smooth forms but there were differences in antigenic structure.—T.E.G.R.

RISTIC, M., WHITE, F. H., DOTY, R. B., HERZBERG, M. & SANDERS, D. A. (1957). **The characteristics of agglutinating antigens of *Vibrio fetus* variants. I. Effects of heat and formalin on serological activity.**—*Amer. J. vet. Res.* **18**, 764-770. [Authors' summary modified.]

1722

A thermolabile superficial antigen on the smooth *V. fetus* cell was demonstrated in agglutination and agglutinin-absorption tests. This characteristic was not completely substantiated on the rough variant cell in the agglutinin-absorption test. Boiling for 2 hours destroyed or removed the superficial antigen of "true" *V. fetus* and only partially degraded or removed that of a "saprophytic" vibrio. Degrees of heterogeneity and inagglutinability were demonstrated between smooth and rough variants within the parent culture and among the variants of 5 strains. Serological heterogeneity of the variants was minimized by the use of heat-treated antigens. The greatest number of cross-reactions between strains occurred when rough heated antigens were agglutinated with sera prepared against rough heated cells. Heat stable antigens of *V. fetus* variants were to a certain extent shared serologically with a "saprophytic" catalase-negative vibrio. The use of heated antigen in addition to formolized antigen may assist in the serological diagnosis of vibriosis.

GAVEZ, E. (1957). Epididimo-orbitide tuberkulozne i brucelozne etiologije sa blastomoidnim fenomenima Leydig-ovih stanica. Opažanja kod sus scrofa domesticus. [Role of Leydig cells in tuberculous and brucellar epididymitis and orchitis in pigs.]—*Veterinaria, Sarajevo* **6**, 33-45. [In Croat. English and German summaries.]

1723

Details of histological examination of tuberculous orchitis in two pigs, and brucellar orchitis in one pig, are given. In one of the pigs with testicular TB., typical Leydig cells, produced by transformation of indifferent mesenchymal cells, were either situated around the atrophied seminiferous tubules, or were in the form of blastoma-like nodules in which case there were signs of incipient, but incomplete, resumption of spermatogenesis. Transformation of Leydig cells back to mesenchymal cells was also observed. In brucella orchitis there was atrophy of the seminiferous tubules in brown-pigmented areas of the testis. Around the tubules there was inter-

stitial tissue composed of Leydig cells, in the form of trabeculae, with consequent formation of giant cells.—E.G.

WEDMAN, E. E. & DRIVER, F. C. (1957). **Lepospirosis and brucellosis titers in deer blood.**—*J. Amer. vet. med. Ass.* **130**, 513-514. 1724

Of 187 deer sera subjected to the agglutination-lysis test for leptospira infection 28 were positive for *L. pomona* and 2 for both *L. pomona* and *L. icterohaemorrhagiae*; 157 were negative. One had a titre of 1:100 in the rapid plate test for brucellosis.—M.G.G.

WEIL, M. H. & SPINK, W. W. (1957). **A comparison of shock due to endotoxin with anaphylactic shock.**—*J. Lab. clin. Med.* **50**, 501-515.

1725

In dogs, i/v injection of endotoxins from Gram-negative micro-organisms caused a sharp fall in blood pressure, marked hyperpnoea, excitement, retching, dullness and coma. Evacuation of the bowels occurred soon after injection frequently followed by vomition, tenesmus and dysentery. There was an immediate marked fall in w.b.c. and platelets; the blood sugar rose slightly but fell to low levels after the second hour. A histamine-like substance appeared in the blood of the posterior vena cava. Death supervened in 3-18 hours. P.M. lesions were severe congestion of the liver, haemorrhage in the intestinal submucosa and oedema of the gall-bladder. Shock was due to pooling of blood in the portal system (raising portal vein pressure and diminishing venous return). It was proved that in the dog the initial reactions are not the results of direct action on the c.n.s. Pretreatment with adrenocortical hormones gave only partial protection. The above observations were similar to those in anaphylactic shock except that endotoxin did not alter the coagulability of the blood and had a delayed toxic effect.—T.E.G.R.

HARRY, E. G. (1957). **The effect on embryonic and chick mortality of yolk contamination with bacteria from the hen.**—*Vet. Rec.* **69**, 1433-1440. [Author's summary modified.]

1726

Death of embryos and chicks can result from infection of the yolk by bacteria of types frequently present in the alimentary tract, and on the skin of the hen. Two outbreaks, however, have been investigated in which *Staph. aureus* of human origin has been the cause of yolk infection. Yolk infection in chicks is usually initiated by bacteria, relatively non-pathogenic in sites other than the yolk, which possess enzymes capable of degrading the yolk protein complexes, and occasionally by toxigenic bac-

teria capable of producing an inflammatory exudate from the yolk sac lining. Yolk infection in embryos is usually attributable to motile bacteria; mortality is highest during the first 2 days of incubation. In infected chicks of relatively high resistance which die, the yolk is coagulated and the yolk sac haemorrhagic to varying degrees. Susceptible chicks and embryos die before macroscopic changes occur in the yolk. Infection in these cases can be demonstrated by histological examination of the yolk and yolk sac. Yolk contaminants, in the embryo, originate from the alimentary tract, or the skin of the hen, and migrate through the shell. The source of yolk contaminants in the chick, apart from bacteria pre-existing in the yolk before hatching, is principally the alimentary tract of the chick, from which bacteria migrate during the first few days after hatching. Factors contributing to fatal yolk infections are a low standard of hygiene on the farm and in the hatchery, which increases contamination with bacteria, and sub-optimal conditions of incubation and storage and brooding of chicks, which delay yolk absorption and lower resistance to infection.

JAMES, J. D. & STOKES, E. J. (1957). Effect of temperature on survival of bacteria in blood for transfusion. With a note on contamination by cold-growing organisms.—*Brit. med. J.* December 14th. 1389-1395.
[Authors' summary slightly modified.] 1727

The problem of contamination of blood for transfusion was investigated, particularly the effect of temperature on contaminating organisms. Bacteria which grow at 37°C. and two strains isolated from infected blood which grow at 4°C. were inoculated into samples of freshly drawn blood in an attempt to reproduce the actual mode of infection during donation. It was demonstrated that, although experimentally there are slight advantages in refrigerating blood within 30 minutes of collection, in practice refrigeration in temperate climates is not essential until at least eight hours after collection. Some samples of blood held at 37°C. for two hours immediately after donation killed small numbers of contaminating bacteria; none of the strains tested multiplied in blood during this time. Prevention of contamination by cold-growing bacteria is discussed and a method is recommended for the examination of blood suspected of infection.

SCHMIDT, B. & DOBBERSTEIN, H. (1958). Über die Wirkung schneller Elektronen aus Beschleunigungsanlagen und Radioisotopen (^{90}Y) auf Mikroorganismen (Radiosterilisation).

[Sterilizing action of fast electrons from accelerators and radioactive yttrium on micro-organisms.]—*Zbl. Bakt. I. (Orig.)* 170, 521-530. [English, French, Spanish and Russian summaries. English summary modified.] 1728

This deals with the possibilities of bacterial sterilization with gamma, and especially with electron, rays. After describing various radiation sources, the authors discuss dosages and the physical behaviour of high-velocity electrons inside matter. The results of direct and indirect effects of ionizing rays upon micro-organisms are summarized. The authors' experiments demonstrate that the mere addition of beta-emitting radioisotopes (^{90}Y) does not sterilize a medium. Micro-organisms can take even very strong degrees of radioactivity without a substantial decrease of the bacterial count. Only when electron-donors, e.g. sodium tungstate, are added to the nutrient medium can the biological radiation effect of electrons be noted. Sterilization is then achieved more or less quickly, according to the degree of activity brought to bear on the culture.

LABIE, C. (1957). Les lésions d'origine mycosique chez les animaux et leurs aspects nouveaux. [Recent developments in the incidence of fungal diseases of animals.]—*Rec. Méd. vét.* 133, 625-646. 1729

The association between the increased incidence of fungus diseases and the use of antibiotics as therapeutic agents and food supplements is discussed and the following diseases are described: actinomycosis, aspergillosis, blastomycosis, candidosis, coccidioidomycosis, histoplasmosis, sporotrichosis, rhinosporidiosis, mucormycosis and saccharomyces. Some of these are important from the point of view of differential diagnosis in tuberculosis control and, at meat inspection, recourse to microscopy will be necessary in the case of tubercle-like lesions. It is stated that many of the fungi are resistant to antibiotics and iodine compounds and the importance of mycoses is difficult to assess owing to the ubiquity of the fungi. Factors predisposing or contributing to a higher incidence of these diseases are also considered.—T.E.G.R.

BURNSIDE, J. E., SIPPEL, W. L., FORGACS, J., CARLL, W. T., ATWOOD, M. B. & DOLL, E. R. (1957). A disease of swine and cattle caused by eating moldy corn. II. Experimental production with pure cultures of molds.—*Amer. J. vet. Res.* 18, 817-824. [Authors' summary modified.] 1730

Thirteen cultures of mould were recovered from maize in fields where pigs were dying. Two, identified as *Penicillium rubrum* and a

strain of *Aspergillus flavus*, proved toxic when grown in pure culture on autoclaved maize which was then dried, ground, and fed to pigs. Of the remaining 11 non-toxic cultures, 8 were strains of *A. flavus* and 3 were *Fusarium moniliforme*. Pigs and mice were poisoned experimentally with the toxic *A. flavus* and with *P. rubrum*, and a goat and 4 horses with *P. rubrum*. The toxicity of the cultures was unchanged by heating to 60° to 70°C. for 26 hours, or by storage in a cool, dry place for 61 days. The toxic principle of *P. rubrum* in ground dried maize was present in the aqueous supernatant extract, which was toxic for horses. The gross and histological lesions were described.

LOGINOV, V. P. (1958). [Acute fusariotoxicosis in piglets.]—*Veterinariya, Moscow* 35, No. 1, pp. 67-68. [In Russian.] **1731**

Newly weaned pigs died within 2-3 days with acute catarrhal inflammation of the nasopharynx, stomatitis, pulmonary oedema and liver dystrophy. They had oedematous eyelids and oedematous swellings about the head and neck. There was frequent yawning, snorting and dyspnoea. Older pigs were not affected, although 3-5 days previously all had been given mouldy wheat bran from which *Fusarium sporotrichoides* var. *minus* was later isolated. Ether extract of the bran caused necrosis when applied to the skin of rabbits and aqueous extract killed mice in 6-7 hours when injected i/p.—R.M.

VOGEL, R. A. & MOSES, M. R. (1957). Weld's method for the rapid identification of *Candida albicans* in clinical materials.—*Amer. J. clin. Path.* 28, 103-106. [Interlingua summary.] **1732**

Strains of *C. albicans*, when incubated on eosin-methylene blue agar in 10% CO₂ at 37°C., produce characteristic spidery colonies within 24-48 hours.—T.E.G.R.

SCHWARZ, J., BAUM, G. L., WANG, C. J. K., BINGHAM, E. L. & RUBEL, H. (1957). Successful infection of pigeons and chickens with *Histoplasma capsulatum*.—*Mycopathologia* 8, 189-193. **1733**

H. capsulatum was recovered from the liver and spleen of 19 pigeons within 24 days after i/v infection, and from one pigeon 45 days after infection. It was also recovered from 5 chicks infected up to 7 days previously.—M.G.G.

HAJSIG, M. (1957). Simultane mikoza s *Trichophyton verrucosum* var. *album* i *Trichophyton violaceum* u goveda. [Simultaneous infection

in cattle with *Trichophyton verrucosum* var. *album* and *T. violaceum*.]—*Vet. Arhiv* 27, 237-241. [In Croat. English and German summaries.] **1734**

During 1954-56 *Trichophyton verrucosum* var. *album* was isolated from 18 cows and an unstated number of heifers with ringworm. In one cow, both *T. verrucosum* var. *album* and *T. violaceum* were present.—E.G.

HYSLOP, N. St. G. (1958). The adaptation of *Asterococcus mycoides* to rodents.—*J. Path. Bact.* 75, 189-199. [Author's summary modified.] **1735**

Rabbits, g.pigs, hamsters and mice may be infected with the organism of bovine contagious pleuropneumonia by intramuscular, intrathoracic or subcutaneous injection of the organism incorporated in an agar gel. The subcutaneous route is the most satisfactory. Fifty subcutaneous passages in mice allowed the organism to adapt itself to mice without reducing its virulence for cattle, whereas material from the 30th passage in mice was attenuated in virulence for cattle by 20 subsequent passages in embryonated eggs. Mouse passage proved valuable for isolation of the organism from contaminated material received for diagnosis from field outbreaks of bovine contagious pleuropneumonia.

TACU, D., GRIGORIU, N. & DANIELESCU, G. (1957). [Action of merthiolate on the agent of contagious agalactia.]—*Anu. Inst. Serui Vaccin. Pasteur Bucuresti* 2, 299-308. [In Roumanian, French, German and Russian summaries.] **1736**

Growth of the agent of contagious agalactia was inhibited *in vitro* by all dilutions up to 1:4,000,000 of "merfen" and were soon killed by concentrations greater than 1:200,000. The action of sodium merthiolate was rather weaker than that of "merfen"; both were more effective at 37°C. than at 20°C.—R.M.

GUTEKUNST, R. R. (1958). Studies on canine pleuropneumonia-like organisms. — Thesis, Cornell pp. 45. **1737**

A study of the incidence and pathogenicity of pleuropneumonia-like organisms (PPLO) of canine origin. Full details are given of the bacteriological media and technique utilized. Of 58 attempts on 35 dogs with signs of respiratory illness, 52 isolations of PPLO were made. Only six isolations were made from dogs with no respiratory disease. There were five distinct colonial types, all strains of which were alike serologically. The organisms were pathogenic for mice, but not for dogs.—H. L. GILMAN.

DUNLOP, W. R. & STROUT, R. G. (1957). State wide testing for PPLLO infection of poultry.—*Proc. 60th Ann. Meet. U.S. live Stk sanit. Ass., Chicago, 1956* pp. 197-202. 1738

Breeding stock negative to agglutination tests for P.P.L.O. was reared, although the incidence of infection in the parent flocks was 80-100%. Eggs were obtained from hens inoculated i/m with 200 mg. of dihydrostreptomycin sulphate not less than 9 days previously, and the batches of chicks were reared on separate farms. Batches which developed respiratory symptoms were discarded. So far some 10,000 uninfected birds aged 24 weeks or more have been obtained.—M.G.G.

See also absts. 1880 (Listerella infection); 1881 (salmonellosis); 1980-1984 (reports, Australia); 1985 (report, Kenya).

DISEASES CAUSED BY PROTOZOAN PARASITES

JAHNES, W. G., FULLMER, H. M. & LI, C. P. (1957). Free living amoebae as contaminants in monkey kidney tissue culture.—*Proc. Soc. exp. Biol., N.Y. 96*, 484-488. [Authors' summary modified.] 1740

Two strains of apparently the same free living amoebae were spontaneous contaminants in monkey tissue culture. Pure cultures were obtained in many cell lines. Both cysts and trophozoites were observed. In monkey kidney tissue culture, cysts were often found in the cytoplasm of the cells. One strain underwent 16 consecutive passages in monkey kidney tissue culture while the other underwent 12. The average cytopathogenic titre of the tissue culture fluid was 10^4 to 10^5 per ml. The cysts in the tissue culture fluid survived at -50°C . for 8 months, although the titre was much reduced.

TERRY, R. J. (1958). Natural immunity to trypanosomes: antibody to *Trypanosoma vivax* present in the serum of normal cotton-rats.—*Trans. R. Soc. trop. Med. Hyg. 52*, 23. [Author's abst. modified.] 1741

The *in vitro* agglutination and lysis of *T. vivax* by a factor present in normal cotton-rat serum was demonstrated under the microscope. This factor was present in the sera of all cotton-rats tested and appeared to be specific for *T. vivax*, no other species of trypanosome being affected. The factor was a protein whose electrophoretic behaviour coincided with that of the β - and faster-moving γ -globulins.

MARKOVIĆ, B. & VUJOŠEVIĆ, J. (1957). [Localization of *Trichomonas foetus* in bulls.]—*Acta vet., Belgrade 7*, 69-78. [In Serbian. French summary.] 1742

Trichomonas foetus was isolated P.M. from the mucous membranes of the penis and prepuce

SMITH, P. F., PEOPLES, D. M. & MORTON, H. E. (1957). Conversion of pleuropneumonialike organisms to bacteria.—*Proc. Soc. exp. Biol., N.Y. 96*, 550-553. [Authors' summary modified.] 1739

A high incidence of diphtheroids was observed in liquid culture of 3 established strains of P.P.L.O. Statistical, morphological, biochemical and serological tests showed a relationship between them and the P.P.L.O. All P.P.L.O. strains tested were serologically related. Strains not giving rise to diphtheroids did not cross react with diphtheroids. Diphtheroids appearing in P.P.L.O. cultures differed from oral and air diphtheroids.

in 13 bulls with chronic infection, but not from the testicles and accessory glands. Its presence in ejaculate is considered to be due to contamination with parasites from the terminal parts of the urethral mucosa. 22 blood and 103 urine samples were free from infection. Details of local treatment with bovacrine and trypaflavine were given, and factors likely to affect cure, like resistance of certain strains, insufficient treatment etc., were discussed.—E.G.

RUBIN, R. & CORDRAY, D. R. (1958). A new approach in chemotherapeutic trials against *Trichomonas infections*.—*Amer. J. vet. Res. 19*, 249-251. [Authors' summary modified.] 1743

Twenty-nine drugs were tested topically, systemically, or by both methods, against *Tr. foetus* in 629 vaginally infected hamsters. Aminitroxole (2-acetylaminio-5-nitrothiazole) had some systemic influence on infection. The tests indicated the usefulness of the infected female hamster for screening drugs of potential value in *Tr. foetus* infection.

PINK, A. N. & YAROSEVICH, G. A. (1957). [Outbreak of porcine rhinitis caused by trichomonads.]—*Veterinariya, Moscow 34*, No. 5, pp. 27-29. [In Russian.] 1744

Atrophic rhinitis was observed in 800 pigs aged from 2 months to 1 year. Swabs from the nasal mucosa were free from bacteria but trichomonads were present: these organisms were not found in swabs from pigs on unaffected farms. Experimental infection of a few lab. animals with washings of nasal mucosa from affected pigs was established in the nose and vagina; g.pigs aborted 5-6 days after infection and died. A rabbit died a week after infection. Affected pigs failed to respond to various treatments.—R.M.

HAMMOND, D. M., FITZGERALD, P. R. & JOHNSON, A. E. (1957). Incidence of trichomonads in the digestive tract and nose of pigs in the western United States.—*J. Parasit.* **43**, 695-696. 1745

Trichomonads were found in the stomach of 10·2% of 431, in the caecum of 72% of 329, and in the nose of 56·3% of 64 pigs. They were found concurrently in the stomach and caecum of 8·2% of 329, in the nose and caecum of 46·6% of 58, in the nose and stomach of 3·5% of 58, and in the nose, stomach and caecum of 1·7% of 58 pigs.—D. POYNTER.

MALEWITZ, T. D., RUNNELLS, R. A. & CALHOUN, M. L. (1958). The pathology of experimentally produced histomoniasis in turkeys.—*Amer. J. vet. Res.* **19**, 181-185. [Authors' summary modified.] 1746

Typical gross lesions were found in the caeca, liver, spleen, kidneys and lungs of turkeys experimentally infected with *Histomonas meleagridis*. Microscopic lesions, in which the parasite was demonstrable, were found in the caeca, liver, kidneys and spleen. The lesions were characterized by hyperaemia, haemorrhage, lymphocytic infiltration, macrophages, the presence of multinucleated giant cells, necrosis, and usually a serous exudate (granulomatous type of inflammation, accompanied by necrosis). In the lungs, pancreas, and heart, there were areas of hyperaemia and serocellular exudate, but parasites were not demonstrable. Lymphocytic infiltration was observed in the lungs. The controls remained healthy, no gross or microscopic lesions being found P.M.

ZULIŃSKI, T. (1957). Dwa przypadki kokcydiozy nerek u konia wywołanej przez *Eimeria* sp. [Renal coccidiosis in two horses.]—*Méd. vét., Varsovie* **13**, 579-580. [In Polish, English and Russian summaries.] 1747

A brief report of histological findings where the schizogony cycle was taking place in the renal tubules. In the author's opinion a new species of *Eimeria* was involved.—M. GITTER.

SHUMARD, R. F. (1957). Ovine coccidiosis. Incidence, possible endotoxin and treatment.—*J. Amer. vet. med. Ass.* **131**, 559-561. 1748

Diagnosis of ovine coccidiosis by demonstration of oocysts is unsatisfactory. The presence of large numbers of oocysts usually means that the period of clinical disease has passed. Improved diagnostic techniques, involving the examination of intestinal material, reveal a much higher incidence of disease in lambs than had hitherto been realized. S. elaborates his belief that much

of the morbidity attributed to ovine coccidiosis is caused by a toxin which is a product of the coccidia.—S. BRIAN KENDALL.

MCLoughlin, D. K., RUBIN, R. & CORDRAY, D. R. (1957). The development of immunity to cecal coccidiosis in the presence of nicarbazin.—*Poult. Sci.* **36**, 1003-1005. 1749

Nicarbazin, at a concentration of 0·0125% of the food, protected the majority of chicks exposed to infection with *Eimeria tenella* while not interfering significantly with the development of resistance.—S. BRIAN KENDALL.

OTTO, G. F., JESKE, H. A., FROST, D. V. & PERDUE, H. S. (1957). Menadione sodium bisulfite complex (Klotogen F) in caecal coccidiosis.—*Poult. Sci.* **36**, 1147. 1750

A menaphthone sodium bisulphite complex or menaphthone itself, showed a coccidiostatic effect against *Eimeria tenella*. It is suggested that the effect was due to the maintenance of normal blood clotting times in the tested birds.
—S. BRIAN KENDALL.

ANGELOVSKI, T. (1957). [Piroplasmosis in Macedonia.]—*Acta vet., Belgrade* **7**, 91-100. [In Serbian. French summary.] 1751

Of 508 blood smears collected from cattle with piroplasmosis in Macedonia during 1953-55, 466 contained *Babesia bovis*, 33 *Theileria dispar*, 5 *Anaplasma marginale*, and 4 *B. bigemina*. Of 133 samples from infected horses, *B. caballi* was present in 60 and *Nuttallia equi* in 73. All 50 blood samples collected from infected sheep contained *B. ovis*. *B. canis* was isolated from a gun dog. Of 2,466 ticks collected from infected animals and healthy animals in their vicinity, 928 were *Boophilus calcaratus*, 402 *Haemaphysalis chodolkovskyi*, 49 *H. inermis*, 35 *H. punctata*, 383 *Rhipicephalus bursa*, 54 *Rh. sanguineus*, 213 *Hyalomma savignyi*, 164 *H. excavatum*, 52 *H. detritum*, 96 *Dermacentor silvarum*, and 90 *Ixodes ricinus*. *Boophilus calcaratus* and *Rh. bursa* were vectors of *Babesia bigemina* and *B. bovis*, *D. silvarum* of *Babesia caballi* and *B. canis*. *Rh. bursa* also harboured *B. ovis* and *N. equi*.—E.G.

RISTIC, M., WHITE, F. H. & SANDERS, D. A. (1957). Detection of *Anaplasma marginale* by means of fluorescein labeled antibody.—*Amer. J. vet. Res.* **18**, 924-928. [Authors' summary modified.] 1752

A globulin fraction was separated from the sera of calves experimentally infected with *A. marginale* and conjugated to fluorescein. Alcohol-fixed organisms in infected blood films

became fluorescent when exposed to the conjugated globulin. The immunological specificity of the staining was ascertained by the use of controls. The ability of unlabelled immune serum to block the fluorescence reaction offers a means of testing sera for the presence of antibody.

ROBY, T. O., MARTIN, W. H., GATES, D. W. & MADDEN, P. A. (1957). The evaluation of the complement-fixation test for anaplasmosis in field control and eradication studies.—*Proc. 60th Ann. Meet. U.S. live Stk sanit. Ass., Chicago, 1956 pp. 60-68.* 1753

In a herd of about 350 cattle 19 were positive to the c.f. test for *Anaplasma marginale* in 1953. Nine were slaughtered, and 10 were treated with large doses of aureomycin. These 10 were negative 8 months later. Subsequent annual tests revealed one doubtful reactor in 1954, four in 1955, and one in 1956. In a herd of about 160 cattle tested in 1953, 61 were positive or doubtful and were culled. In 1954 five more positive reactors and in 1955 two doubtful reactors were removed. In 1956 all the animals were negative.

An eradication campaign in the Hawaiian Islands has so far been conducted on 89 dairy herds containing over 14,000 animals. The herds undergo the c.f. test every 60 days, and positive reactors are removed. A herd is considered free from infection when it has passed two successive tests. In 1956 altogether 167 reactors were culled. Imported cattle undergo the c.f. test twice, with an interval of 60 days between tests, before being admitted to indigenous herds.

—M.G.G.

CHRISTENSEN, J. F. & HARROLD, J. B. (1957). Inhibition of *Anaplasma marginale* infection in cattle with oxytetracycline hydrochloride.—*Proc. 60th Ann. Meet. U.S. live Stk sanit. Ass., Chicago, 1956 pp. 69-76.* 1754

Eleven heifers of the same origin, condition and age were obtained. Two of them were positive to the c.f. test for anaplasmosis. Each heifer was inoculated s/c with blood from carriers of a strain of *A. marginale*. When blood samples began to show an increase in anaplasma bodies, 6 of the animals negative to the c.f. test were treated with oxytetracycline hydrochloride i/m, at the rate of 3 mg. per lb. body wt. daily for 3 days. Development of the infections was promptly arrested. Severe anaplasmosis occurred in 2 of the 3 control heifers, and mild anaplasmosis in the 2 animals positive to the c.f. test.

—M.G.G.

FRANKLIN, T. E. & REDMOND, H. E. (1958). Observations on the morphology of *Anaplasma*

marginale with reference to projections or tails.—*Amer. J. vet. Res.* **19**, 252-253. [Authors' summary modified.] 1755

In 5 of 6 splenectomized calves inoculated with blood from a known carrier of *A. marginale*, projections, or tails, extending from typical anaplasma bodies were observed at different times. Similar tails had since been observed in the blood of non-splenectomized calves infected with anaplasmosis. This phenomenon was observed only with this particular strain of the organism. This probably represented one stage in the normal development of *A. marginale* in the blood of cattle.

CAMPBELL, R. S. F., MACKAY, J. M. K. & VANTSIS, J. T. (1958). Canine toxoplasmosis. The isolation of *Toxoplasma gondii* from a dog.—*J. comp. Path.* **68**, 96-105. [Authors' conclusions modified.] 1756

The parasite was isolated from one of two dogs. The pathogenicity of the isolated strain for laboratory animals, including dogs, and for embryonated eggs was described and compared with that of the human RH strain. Infection was associated with the production of a toxic factor in the peritoneal fluid of the mouse and dog. The strain was serologically almost identical with the human strain.

I. BORGREN, P. H. F. & BERG, O. A. (1957). Toxoplasma dye test in dogs in Norway.—*Acta path. microbiol. scand.* **41**, 353-357. [In English, Abst. from authors' summary.] 1757
II. ERICHSEN, S. & BORGREN, P. H. F. (1957). Histological examination of the brains of dogs with positive toxoplasma dye test titers. —*Ibid.* 358-360. [In English, Authors' summary modified.] 1758

I. 200 dogs, 6 months to 13 years old and of 32 breeds, were examined with the toxoplasma dye test. 55.5% showed negative reactions. The remaining dogs reacted positively with titres ranging from 1:4 to 1:200 (terminal serum dilution). Positive reactions were more common in older dogs. The dye test values obtained showed no relation to environment, sex, breed, use or state of health of the animals. Most of the positive reactors had titres of the same magnitude as is commonly found in human sera examined with the same technique. The results appear to support the view that toxoplasmosis in dogs is related to the disease in the human population.

II. Histological sections from the central nervous system of 8 dogs having positive dye tests were examined for toxoplasma-like struc-

tures. In one case only, with a dye test positive at 1:200 and doubtful at 1:400, 3 possible toxoplasma pseudocysts were found.

EYLES, D. E. & COLEMAN, N. (1957). An evaluation of the effect of sulfones on experimental toxoplasmosis in the mouse.—*Antibiot. & Chemother.* **7**, 577-585. [Spanish summary pp. 619-620. Authors' summary modified.]

1759

The observation of others that sulphones, particularly those related to 4,4'-diaminodiphenyl sulphone, are active against *Toxoplasma* infection was confirmed by the present study, and the activity of a number of compounds not previously tested was assessed. Cure cannot be obtained in mice with the sulphones with any degree of regularity. This group of compounds would appear to be poorer in this respect than the sulphonamides. The findings did not support the observations reported by Cross (1951, 1952) that sulphoxone sodium and glucosulphone sodium are superior to sulphadiazine in antitoxoplasmic activity; in fact, the great discrepancy of the observations indicated the possibility of differences in the strains of *Toxoplasma*. The authors concluded that the sulphones are inferior to sulphonamides and could be of practical value only in cases in which patients could not tolerate sulphonamides. The observed synergic action of pyrimethamine and 4,4'-diaminodiphenyl sul-

phone was expected, since the mode of action of the sulphone was believed to be similar to that of the sulphonamides. The significance of the observed lesser degree of interaction remains to be determined.

RANALI, E., GONZALEZ, G. S., RAKE, G. W. & KOERBER, W. L. (1958). Chemotherapeutic control of experimental babesial and anaplasmal infections in cattle in Brazil.—*J. Amer. vet. med. Ass.* **132**, 63-67.

1760

Pregnant cows were immunized by injection of blood containing *Babesia bigemina*, *B. argentina* and *Anaplasma marginale*. A febrile reaction, attributed to babesia, occurred at an average of 9.1 days after infection and was suppressed by a single i/m inj. of β,β' -diguanyl-diazoamine-benzene (2.0 mg./kg. body wt.); none of the doses employed (1.0-3.0 mg./kg.) cleared the blood of babesia. A second febrile reaction, ascribed to *A. marginale* occurred at an average of 30.4 days after infection and was controlled by an i/v inj. of tetracycline hydrochloride (2.5 mg./kg.); administered i/m the drug was 100% effective at doses of 5.0 and 7.0 mg./kg., the latter dose producing a local swelling; 12.5 mg./kg. by the oral route was 66.7% effective. The animals were resistant to re-infection by ticks infected with all three protozoa; no abortions or other ill-effects resulted from treatment.—T.E.G.R.

See also absts. 1980-1983 (reports, Australia); **1985** (report, Kenya).

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

SCHANG, P. J. (1957). Treinta años de utilización de la técnica de aislamiento de focos de aftosa. [Thirty years' experience of prevention of spread of foot and mouth disease from research institutes.]—*Gac. vet., B. Aires* **19**, 55-56.

1761

Prevention of spread of foot and mouth disease from research laboratories has been successfully practised for 30 years. The method employed at the National Institute for foot and mouth disease research over a period of 20 years consists in double fencing round the paddock holding infected animals. There was no spread of infection and no mixing of the types of virus. This is held to confirm the previous conclusion that sparrows, insects, hares, and other wild animals do not normally spread the disease.

—T.E.G.R.

CUNHA, R. G., TORTURELLA, I., SAILE, J. L. & SERRÃO, U. M. (1958). Experimental mixed infection of cattle with foot-and-mouth disease

viruses.—*Amer. J. vet. Res.* **19**, 78-83. [Authors' summary modified.]

1762

Six cattle were inoculated i/d on the tongue with the Vallée O, Vallée A, and Waldmann C types of F. & M. disease virus. There was no interference in the simultaneous multiplication of these three strains in different parts of the tongue. The subsequent course of the disease was by the development of secondary lesions. In 5 of the 6 cattle these were produced, apparently exclusively, by type C virus. In the sixth animal O and A virus strains were identified in material from the same vesicular lesions. All the cattle developed high levels of type C antibody subsequent to the virus inoculation. Initially, the development of type A antibody was similar, but the levels dropped more quickly. Only 3 animals showed a significant but transitory development of Type O antibody.

I. VERGE, J., DHENNIN, LOUIS, DHENNIN, LÉONE., FONTAINE, M. & LARENAUDIE, B.

(1957). La réaction d'Oudin-Ouchterlony appliquée à l'étude du virus aphteux. [The Oudin-Ouchterlony method applied to foot and mouth disease virus.]—*Rev. Immunol.* **21**, 260-270. **1763**

II. MACKOWIAK, C., FAYET, M.-T. & CAMAND, R. (1957). Précipitation spécifique du virus aphteux par la méthode d'Ouchterlony. [Specific precipitation of foot and mouth disease virus by the Ouchterlony method.]—*Ibid.* **21**, 271-279. **1764**

I. & II. The authors confirmed previous findings that type-specific reactions occurred between different types of the virus and their respective antisera in agar gel. [See also *V.B.* **27**, 2367.]—R.M.

MAZZARACCHIO, V., ZAVAGLI, V., ORFEI, Z., D'AMORE, A., RAVAIOLI, L. & CASTAGNOLI, B. (1957). Controllo sperimentale della efficacia nei bovini di un vaccino antiaftoso con virus coltivati su cellule renali trypsinate di suino. (Nota preventiva). [Experimental research on a foot and mouth disease vaccine prepared from virus grown on trypsinized porcine kidney tissue culture.]—*Zooprofilassi* **12**, 539-542. [English summary.] **1765**

This is a preliminary note on monovalent vaccines prepared with type "O" and type "A" virus. These were harmless and conferred complete protection 21 days after vaccination; re-vaccination did not cause anaphylaxis.

—T.E.G.R.

MAZZARACCHIO, V., ORFEI, Z., D'AMORE, A., RAVAIOLI, L. & CASTAGNOLI, B. (1957). Il virus aftoso su coltura di tessuti in "vitro". I. Coltivazione dei ceppi A₄-O-C su cellule renali trypsinate di suino. II. Curva di crescita "in vitro" ed "in vivo" dei tipi A₄-O-C. [Cultivation of foot and mouth disease virus in tissue culture. I. Cultivation of types A₄, O and C on trypsinized porcine kidney cells. II. Growth curve of the types A₄, O and C in vitro and in vivo.]—*R. C. Ist. sup. Sanit.* **20**, 510-513 & 514-521. [English, French and German summaries.] **1766**

I. The virus was grown on trypsinized kidney cells of young pigs. Type A₄ was cytopathogenic at the first and types O and C at the second passage, between the 10th and 48th hour after inoculation according to the quantity of virus. Types A₄ and C were passaged 15 times and type O five times.

II. The growth curve of the three types

was studied in pig kidney cell culture, in g.pigs, and in mice. There were four distinct phases: adsorption, multiplication, rapid decrease and gradual decrease.—T.E.G.R.

SORENSEN, D. K., CHOW, T. L., KOWALCZYK, T., HANSON, R. P. & BRANDLY, C. A. (1958). Persistence in cattle of serum-neutralizing antibodies of vesicular stomatitis virus.—*Amer. J. vet. Res.* **19**, 74-77. [Authors' summary modified.] **1767**

Cattle usually recover from an infection with vesicular stomatitis virus within two weeks, and may again become susceptible within a few months. Virus-neutralizing antibodies did not disappear with the loss of resistance to re-infection, although the titres were sometimes reduced. The titres subsequently increased and this fluctuation continued over long periods, in cycles lasting several months. Animals in herds exposed to infection during an outbreak of vesicular stomatitis in 1949 still possessed high neutralizing titres in 1952 and 1953 and, in a few animals, in 1957. Animals born in these herds after 1949 did not possess neutralizing titres in 1952 and 1953. The persistence of fluctuating titres of neutralizing antibody was studied in cattle exposed to the virus. The possible mechanism of persisting immunity was discussed.

SULKIN, S. E., KRUTZSCH, P. H., WALLIS, C. & ALLEN, R. (1957). Role of brown fat in pathogenesis of rabies in insectivorous bats (*Tadarida b. mexicana*).—*Proc. Soc. exp. Biol., N.Y.* **96**, 461-464. [Authors' summary modified.] **1768**

Studies on the progression of peripherally inoculated rabies virus in bats (*T. brasiliensis mexicana*) suggest that the brown (hibernating) fat plays a role in the pathogenesis of rabies in this animal. The virus may be stored in the brown fat of symptomless bats. These studies provide another example of selective viral lipotropism.

I. THOMPSON, S. W., JR. (1957). The effect of five proteolytic enzymes on some antigenic characteristics of rabies virus—with observations on the resistance of the virus to heat.—*Amer. J. vet. Res.* **18**, 886-894. [Author's summary modified.] **1769**

II. THOMPSON, S. W., JR. (1957). Some effects of a bacterial protease on the complement-fixing antigenicity of rabies virus.—*Ibid.* 895-897. [Author's conclusion copied verbatim.] **1770**

I. Rabbit brain emulsions of 5 strains of

rabies virus were subjected to proteolysis with each of 5 enzymes, after which serial dilutions of enzyme-brain emulsion of each strain were prepared. Groups of mice were inoculated intracerebrally with each dilution and the survivors were challenged intracerebrally with 4 LD₅₀ of homologous virus 21 days later. Mice inoculated intracerebrally with brain emulsion treated with either "Rhozyme P-11" or "Protease 15" developed immunity. Mice given single or multiple i/p injections of a supernatant fluid of a 10% suspension of rabies-infected rabbit brain emulsion subjected to proteolysis with either "Rhozyme P-11" or "Protease 15" showed no immunity when challenged 14 days later.

II. The enzyme, Protease 15, does not interfere with the complement-fixing antigenicity of the CVS strain of rabies virus.

PAVLOVIĆ, D., ĐORĐEVIĆ, D., SOKOLIĆ, A., RADOJČEVIĆ, M. & ĐURIČIĆ, I. (1957). [Proteinæmia in sheep following vaccination with avianized rabies vaccine.]—*Acta vet., Belgrade* 7, 19-32. [In Serbian. German summary.] **1771**

Details are given of examination by classical and paper electrophoresis, by Van Slyke's method for the determination of total serum protein, and by the Weltmann reaction, of serum protein in 16 rams following vaccination with avianized rabies vaccine (Flury strain). Apart from a relative increase in the β_1 -globulin fraction, changes were much less marked than those following vaccination against anthrax and sheep pox. Results are summarized in six tables and four graphs.—E.G.

RISLAKKI, V. (1957). On the properties of Finnish antirabies vaccine.—*Thesis, Helsinki* pp. 61. **1772**

Some experiments were carried out with the phenolized antirabies vaccine developed in Finland by Hindersson. The vaccine is considered to have a good value in experimental animals. The field trials were restricted to an area where rabies had occurred during 1951-56, at the frontier with the U.S.S.R. The number of rabies infected dogs decreased, however, before the vaccination programme was put into force, and the decrease demonstrable in Eastern Finland was probably mostly due to whatever measures had been taken in the U.S.S.R. against rabies. [The figures given by the author do not correspond with the official statistics.]

—H. WESTERMARCK.

GREIG, A. S. & BEAUREGARD, M. (1957). Laboratory studies of an outbreak of canary-

pox.—*Canad. J. comp. Med.* 21, 407-414. [French summary.] **1773**

An outbreak of canary pox in a Canadian aviary is described together with the laboratory studies and a review of published literature on the subject. The virus was isolated by chick embryo inoculation and while it proved infective for canaries by oral administration or cutaneous scratch, it failed to produce noticeable lesions in baby chicks or young cockerels. Histopathological studies on the specific lesions in canaries and the infected chorioallantoic membranes of inoculated eggs are also presented.

—R. V. L. WALKER.

THEILER, M. (1957). Action of sodium desoxycholate on arthropod-borne viruses.—*Proc. Soc. exp. Biol., N.Y.* 96, 380-382. [Author's summary modified.] **1774**

Tests on arthropod-borne viruses revealed that they were inactivated by a 1:1000 dilution of sodium desoxycholate. Viruses resistant to this bile salt were strains of human poliomyelitis, mouse encephalomyelitis, Coxsackie and encephalomyocarditis viruses.

KARSTAD, L., SPALATIN, J. & HANSON, R. P. (1957). Application of the paper disc technique to the collection of whole blood and serum samples in studies on eastern equine encephalomyelitis.—*J. infect. Dis.* 101, 295-299. [Authors' summary modified.] **1775**

Serum and whole blood samples were collected on paper disks from horses and wild birds in southern Georgia for neutralization tests against eastern equine encephalomyelitis virus. The disks were saturated with small amounts of blood or serum, dried by exposure to air and posted to the laboratory. Although the neutralization titres of the paper eluates were lower than those derived from fluid serum controls, the reduction did not impair the validity of the test or render interpretation difficult. The method simplified collection, handling, storage and dispatch and very small quantities of blood and serum could be tested. The procedure appears to be of value in epidemiological studies.

RADOMIŃSKI, W. & BOSKI, A. (1957). Badania nad zastosowaniem odczynu wiązania dopełniacza w rozpoznawaniu niedokrwistości zakaźnej koni. II. Próby zniesienia własności antykomplementarnych badanych surowic końskich. [Complement-fixation test for equine infectious anaemia. II. Reduction of anti-complementary properties in serum.]—*Méd. vét., Varsovie* 13, 582-588. [In Polish. English and Russian summaries.] **1776**

The authors tried to reduce the anticomple-

mentary properties of equine sera by: (1) adsorption of non-specific antibodies on powdered animal tissues according to the method described by Rapp *et al.* [V.B. 26, 1663]; (2) the use of dog serum as a source of complement and (3) the hypertonization method described by Nordberg & Schjerning-Thiesen [V.B. 26, 3443]. The first two methods were found unsatisfactory but the third reduced considerably the anticomplementary properties of the sera. Parallel c.f. tests were carried out on 107 serum samples from 73 horses, using the Altara and temporary hypertonization techniques. 19 horses gave a positive reaction with the second method and 13 of them were confirmed by subsequent P.M. and histological examinations. Of these 13, six were positive, five doubtful and two negative with the Altara method. The authors concluded that the temporary hypertonization method was more accurate for detecting carriers of E.I.A. than the generally accepted c.f. test.

—M. GITTER.

BIRKETT, J. O. (1958). Duration of immunity conferred by wet lapinised rinderpest virus vaccine in N'Dama cattle in Sierra Leone.—

J. comp. Path. 68, 115-120. [Author's conclusions modified.] **1777**

B. gave a brief history of the introduction into Sierra Leone of lapinized virus. Wet lapinized virus was shown to be an excellent immunological agent in N'Dama cattle and immunity lasted for at least 49 months. The symptoms following its inoculation were described.

SCHWARZ, A. J. F., YORK, C. J., ZIRBEL, L. W. & ESTELA, L. A. (1957). Modification of infectious bovine rhinotracheitis (IBR) virus in tissue culture and development of a vaccine.—*Proc. Soc. exp. Biol., N.Y.* 96, 453-458. [Authors' summary modified.] **1778**

A modified infectious bovine rhinotracheitis virus was produced by rapid passages and terminal dilutions in bovine embryonic kidney tissue culture. Its avirulence was demonstrated by intramuscular and intranasal inoculation of susceptible cattle. After i/m inoculation into cattle, it did not spread to susceptible contacts, could not be recovered from blood or nasal washings, and elicited an immune response which protected against challenge with virulent virus. A freeze-dried vaccine was prepared, which was stable for 8 months at 4°C.

CHEATHAM, W. J. & CRANDELL, R. A. (1957). Occurrence of intranuclear inclusions in tissue cultures infected with virus of infectious bovine rhinotracheitis.—*Proc. Soc. exp. Biol.,*

N.Y. 96, 536-538. [Authors' summary modified.] **1779**

The virus of infectious bovine rhinotracheitis was isolated and passaged in cultures of human amnion, producing lesions similar to those in cultures of bovine kidney. Specific intranuclear inclusions were noted in tissue culture and in cases of the disease produced experimentally with the 3 strains of virus studied.

LEE, K. M. & GILLESPIE, J. H. (1957). Propagation of virus diarrhea virus of cattle in tissue culture.—*Amer. J. vet. Res.* 18, 952-953. [Authors' summary modified.] **1780**

A strain of the causal agent of virus diarrhoea isolated from cattle in New York State underwent 20 consecutive passages in bovine embryonic skin-muscle tissue prepared in roller tubes by the plasma-clot method and 15 further passages in bovine embryonic kidney cortex cells prepared by trypsinization. Multiplication was not associated with conspicuous cytopathogenic effect, but the virus was apparently maintained at full virulence. The concentration of virus in fluid from tissue cultures ranged from 10^5 to 10^7 .

SHOPE, R. E. (1957). Provocation of masked hog cholera virus in lungworm-infested swine by Ascaris larvae.—*Science* 126, 1236. **1781**

S. claimed to have infected larvae of pig lungworm with swine fever virus. When the infected larvae were fed to pigs, the pigs did not immediately develop swine fever but did so only after being subjected to stress in the form of migrating ascarid larvae.—R.M.

CHENEY, G. L. & SMITH, J. V. (1957). Observations on hog cholera vaccination in garbage-fed swine in Connecticut.—*J. Amer. vet. med. Ass.* 131, 565-566. [Authors' summary modified.] **1782**

Pig rearers require a licence in the State of Connecticut. On request, an approved veterinarian will be assigned to administer biological products that are supplied to the farmer at cost, for vaccinating against swine fever. Up to 1953, 2 to 3 ml. of virulent virus and 40 to 60 ml. of swine fever immune serum were used. Since 1953, more than 22,000 pigs have been inoculated with 2 ml. modified live virus vaccine of rabbit origin plus 20 to 40 ml. of serum. This method has seemed as effective in producing resistance to swine fever as the use of virulent virus and has not resulted in significant complications.

CHVÁTAL, O. (1957). Průkaz protilátek při virové enzootické bronchopneumonii (chřipce) prasat hemaglutinačně inhibiční reakcí.

[**Demonstration of antibodies in porcine virus pneumonia by the haemagglutination-inhibition reaction.Sborn. čes. Akad. zemědělsk. Věd. Vet. Med. **30**, 81-92. [In Czech. English, German and Russian summaries.] **1783****

Antibodies were not demonstrable by the haemagglutination-inhibition reaction in 860 serum samples from apparently healthy slaughter pigs, using four indigenous swine influenza strains and Shope's strain. Of 96 samples from pigs affected to varying degrees with respiratory conditions, 16 had H.I. titres ranging from 16-512, but mostly 128-256. These 16 included two samples from one pig which had been infected experimentally. It was assumed that respiratory conditions in those pigs which had yielded negative reactions were probably caused by bacteria or lungworms, or by a virus of a different antigenic structure. Relatively higher titres were obtained with one of the indigenous strains and H.I. reactions using Shope's virus were negative.—E.G.

LEADER, R. W. (1958). Cytopathology and rate of release of infectious canine hepatitis virus grown in dog kidney cells.—*Amer. J. vet. Res.* **19**, 152-158. [Author's summary modified.] **1784**

An account of cytological changes in canine kidney cell cultures inoculated with infectious canine hepatitis virus. The first definite change was the appearance of intranuclear inclusion bodies, commencing at about 23 hours after exposure of cells to the virus. The number of cells containing inclusions subsequently increased. As the infection progressed, cells were seen to die and large gaps appeared in the cell sheet. Estimates of the rate of virus propagation were made by assay of fluids surrounding infected cells at intervals after inoculation.

HELLER, O. (1957). Beitrag zur Epidemiologie der Hühnerpest: Gänse als latente Virusträger. [Epidemiology of Newcastle disease—geese as latent carriers.]—*Mh. VetMed.* **12**, 218-219. **1785**

When Newcastle disease broke out in a flock of 69 fowls, the fowls were slaughtered and the premises disinfected, but 2 geese were allowed to remain. Seven weeks later 35 healthy fowls were purchased, but after 14 days a second, more severe outbreak occurred, with high mortality. P.M. examination of one of the geese revealed a thickened duodenal mucosa with petechiae. It was considered that the geese harboured the virus and thereby increased its virulence. Newcastle disease was confirmed in

another flock a week after they had been fed the uncooked viscera of an imported goose. It was concluded that in the eradication of Newcastle disease the slaughter of ducks and geese should be considered, and that imported ducks and geese should undergo the same precautionary measures for Newcastle disease as imported fowls.—M.G.G.

NADEL, M. K., FRYER, H. C. & EISENSTARK, A. (1957). The probable minimum numbers of Newcastle disease virus particles required to initiate infection in chick embryos and baby chicks.—*J. infect. Dis.* **100**, 88-91. [Authors' summary modified.] **1786**

Infectivity titres obtained by inoculation of serial dilutions of Newcastle disease virus into embryonated eggs and 2-day-old chicks were studied statistically to determine the probable minimum number of mature virus particles required to initiate an infection. The observed death rates in embryos and chicks were compared with theoretical death rates based on two general hypotheses: (1) That the presence of at least r virus particles in the inoculum is sufficient to induce infection, and (2) that the virus particles must attack at least r sensitive loci on the surface of the embryo cells or the chick brain cells before infection is accomplished. The evidence of this study supports the conclusion that either a single virus particle in the inoculum or a successful attack of a single locus is sufficient to kill the embryonated egg. From two to four, or possibly even five, N.D.V. particles are needed to kill the 2-day-old chick. Under hypothesis (1), two particles in the inoculum are sufficient to kill the chick (*i.e.*, $r=2$); but under hypothesis (2), the number of sensitive loci which must be attacked by the virus is probably from two to four (*i.e.*, $r=2$ to 4).

SULLIVAN, D. J. (1958). Lesions in the cerebellum and in the reticular and vestibular centers in Newcastle disease.—*Amer. J. vet. Res.* **19**, 186-190. [Author's summary modified.] **1787**

Newcastle disease was induced in susceptible, 5-week-old chickens by the i/m injection of California strain 11914 of N.D.V. All inoculated chickens died from the disease or were killed within 96 hours. The symptoms were drowsiness, tremors, inability to maintain the posture of the head and finally paralysis and coma. The birds were unable to maintain a normal attitude after the appearance of the tremors. The predominant tissue change was an extensive hyperaemia of the c.n.s. accom-

panied by proliferation of the endothelial cells. Degenerative changes of the neurones, ranging from mild chromatolysis to frank necrosis, were found in all cases primarily in the vestibular, reticular, and cerebellar nuclei, and in the Purkinje cells.

DOMERMUTH, C. H. & EDWARDS, O. F. (1957).

An electron microscope study of chorioallantoic membrane infected with the virus of avian infectious bronchitis.—*J. infect. Dis.* 100, 74-81. [Authors' summary modified.]

1788

Ultra-thin sections of chick chorioallantoic membranes infected with avian infectious bronchitis virus were prepared by a modification of the thermal expansion sectioning method. The sections were mounted in collodion and lightly shadowed with chromium before examination in the electron microscope. Nearly all the particles of the virus were electron dense spherical bodies averaging 178 m μ in diam. One section of tissue contained, in addition, virus particles averaging 200 m μ in diam. The virus particles were arranged in pairs, singly, in chains and in clumps. A few virus particles were found that had less than average electron density. Variations in the electron density within certain individual particles gave them a "doughnut" appearance. Some virus particles exhibited a discrete internal structure, which formed a pattern that suggested a macromolecular internal arrangement. Rows of clear spots of less electron density, about 20 m μ in diam, each of which contained a smaller electron dense body, made up this pattern. No normal tissue was found in the infected tissue sections.

JUNGHERR, E. L., CHOMIAK, T. W. & LUGINBUHL, R. E. (1957). Immunologic differences in strains of infectious bronchitis virus.—*Proc. 60th Ann. Meet. U.S. live Stk sanit. Ass., Chicago*, 1956 pp. 203-209.

1789

Neutralization tests in chicks and chick embryos, and cross immunization tests in chicks with 3 strains of infectious bronchitis virus revealed 2 antigenic types of the virus. It is proposed to name them Connecticut type and Massachusetts type.—M.G.G.

VELLING, G. (1957). A conjunctivitis occurring in chickens, presumably of an infectious nature.—*Nord. VetMed.* 9, 505-520. [In English. German and Danish summaries.]

1790

In Denmark, from 1953 to 1956, nine out-

breaks of conjunctivitis were observed in chicks 2-12 weeks old, reared under intensive conditions. The conjunctiva and nictitating membrane become red and swollen, an exudate forms beneath the nictitating membrane and on the eyeball, and occasionally panophthalmitis develops, destroying the eye. Mortality increases with every new batch of chicks, and may rise to 35%. Histological examination of conjunctival and nictitating membranes revealed oedema, and infiltration by lymphocytes and eosinophilic granulocytes into the epithelium and underlying tissues, but no inclusion bodies, bacteria, mycelia or other parasites were seen. Culture revealed many species of bacteria, considered to be secondary invaders. No fungi were isolated. Inoculation of a suspension of conjunctival tissue into the allantoic cavity of chick embryos killed some of the embryos, but no bacteria were recovered from them. Healthy chicks caught the disease from infected chicks when placed in the same cage or in the same room. It is concluded that the disease is probably caused by a virus. Its development is encouraged by overcrowding and poor hygiene.

—M.G.G.

DAVIS, D. E. & DELAPLANE, J. P. (1958). The effect of chlortetracycline treatment of turkeys affected with ornithosis.—*Amer. J. vet. Res.* 19, 169-173. [Authors' summary modified.]

1791

Chlortetracycline, when fed for two weeks in an all-mash ration at 100, 200, 400, and 800 g. per ton, did not aid in the elimination of psittacosis virus from infected 3-week-old pouls. When similar treatment was given for three weeks, feed containing 100 g. per ton was ineffective, but concentrations of 200 g. or greater were effective. The virus was not recovered from experimentally infected adult turkeys treated for two or three weeks with feed containing 200 or 400 g. per ton. Virus was recovered from untreated adult turkeys 24 days after inoculation, but not after 31 days.

KRADOLFER, F. & WYLER, R. (1957). Photoaktivierbare Antiviruswirkung von Porphyrinen. [Antiviral action of porphyrins.]—*Z. Hyg. InfektKr.* 143, 416-428.

1792

Allantoic fluid or organ suspensions containing influenza, Newcastle disease or ectromelia virus lost their infectivity when exposed to daylight following the addition of low concentrations of deuteroporphyrin. The possible value of these findings was discussed.—E.G.

REVO, M. V. (1956). [Viruses and virus diseases of farm animals.] pp. 495. Kiev: Gosud. izdat. sel'skokhoz. literaturui Ukrainskoi S.S.R. 14r. 75k. [In Russian.] **1793**

The author, Professor Revo of Kharkov, is a doctor of medicine and a veterinary surgeon, and a leading scientist in the Ukraine. His book begins with 83 pages on general virology, devoted to the biological, physical and immunological properties of viruses and the pathogenesis and chemotherapy of virus diseases. In the remainder (Special Virology) there are detailed and lucid accounts of 24 of the virus diseases of farm animals: there are 56 pages on foot and mouth disease, 50 pages on swine fever, 18 pages on rinderpest, and so on. The chapter on infectious equine encephalomyelitis in the U.S.S.R. (pp. 268-293) is of special interest; it is preceded by an account of American equine encephalomyelitis. There are some omissions, such as ovine virus abortion, infectious laryngo-

tracheitis of fowls, bluetongue, distemper, myxomatosis, psittacosis and the mucosal diseases of cattle. Only books and monographs are listed in the bibliography, but authors are freely cited in the text, with the dates of their publications. The paper and printing are of good quality, but illustrations are few and poor. The price in the United Kingdom is 12s. 6d.—R.M.

MONTEMAGNO, F. (1957). Prima segnalazione in Italia della Rickettsiosi congiuntivale dei ruminanti nei bovini. [*Rickettsia conjunctivae infection of cattle in Italy.*]—*Acta med. vet., Napoli* **3**, 3-16. [English, French, German and Spanish summaries.] **1794**

Rickettsial conjunctivitis, with keratitis in some cases, was diagnosed clinically in a herd of 160 cattle and *R. conjunctivae* was demonstrated microscopically in conjunctival scrapings. The condition responded to treatment with chlorotetracycline.—T.E.G.R.

See also absts. 1880 (bovine malignant catarrh); 1881 (psittacosis); 1980-1984 (reports, Australia); 1985 (report, Kenya).

IMMUNITY

BURNETT, F. M. (1957). A modification of Jerne's theory of antibody production using the concept of clonal selection.—*Aust. J. Sci.* **20**, 67-71. **1795**

The three current theoretical interpretations of antibody production are reviewed briefly and referred to as the direct template theory, the indirect template theory and the natural selection theory.

A modification of the natural selection theory using the concept of clonal selection is formulated and stated in some detail. It is claimed that its chief advantage over the indirect template theory is its relevance to the nature of normal antibodies and the simpler interpretation of tolerance to potential antigens experienced in embryonic life. Its advantages over the natural selection theory are its capacity to cover homograft and related types of immunity as well as the production of classical antibody and to eliminate the assumption that entry of a globulin molecule into a cell will stimulate the cell to produce exact replicas of that globulin.

—D. F. STEWART.

GARDNER, R. J. & CRAWLEY, W. (1958). Further observations on the maternal transference of antibodies in the bovine.—*J. comp. Path.* **68**, 112-114. [Authors' conclusions copied verbatim.] **1796**

Homologous bovine γ -globulin labelled with ^{131}I was not concentrated by the mammary gland of a five months pregnant cow. Labelled γ -glob-

ulin prepared from a cow and introduced intravenously into a heifer in the late stages of pregnancy was concentrated to the extent of two to three times in the mammary secretion. Secretion of γ -globulin into the precolostrum ceased abruptly at parturition.

MORRIS, I. G. (1958). Experimentally induced haemolytic disease in young mice.—*J. Path. Bact.* **75**, 201-210. [Author's summary modified.] **1797**

Haemolytic anaemia was produced in young mice by injecting or feeding anti-mouse sera prepared in rabbits. After large doses of anti-serum, the mice died quickly showing pallor only. With smaller doses, jaundice and bilirubinuria appeared. With still smaller doses haemoglobinuria occurred after a comparatively late interval. Some of the animals showing haemoglobinuria survived. Anaemia was also produced in adult mice, in which haemoglobinuria appeared soon after the reception of anti-serum. Young rats injected or fed with anti-rat sera prepared in rabbits also exhibited early haemoglobinuria. Complement activity was detected in the serum of the adult mouse and the young rat, but not in young mouse serum. Young mice injected with g.pig complement and fed with antiserum exhibited early haemoglobinuria. The early haemoglobinuria which occurs in adult mice and in young rats after the reception of antiserum, and in young mice after the reception of antiserum and complement is due to

the intravascular lysis of red cells by haemolysin and complement, whilst the late haemoglobinuria which occurs in young mice after the reception of antiserum alone is thought to be due to the

See also absts. 1653 (streptococcal mastitis); 1661-1663 (anthrax); 1675 & 1676 (swine erysipelas); 1687 (transplacental immunity in calf paratyphoid); 1695 (salmonellosis); 1701-1702, 1704 & 1706-1708 (brucellosis); 1716 (Cl. haemolyticum); 1741 (trypanosomes); 1749 (Eimeria tenella); 1765 (F. & M. disease); 1772 (rabies); 1777 (rinderpest); 1778 (infectious bovine rhinotracheitis); 1782 (swine fever); 1818 (Forsmann antibody in *A. lumbricoides* infection); 1980-1983 reports, Australia); 1985 (report, Kenya).

PARASITES IN RELATION TO DISEASE [GENERAL]

DRUDGE, J. H., LELAND, S. E., JR., WYANT, Z. N., ELAM, G. W., SMITH, C. E., JR. & DALE, E., JR. (1957). Critical tests with piperazine-carbon disulfide complex (Parvex) against parasites of the horse.—*Amer. J. vet. Res.* 18, 792-797. [Authors' summary modified.]

1798

Critical tests with a suspension of piperazine-carbon disulphide complex were carried out in 7 horses, using dose rates of 75, 100, 150, and 200 mg./kg. body wt. Both mature

physiological disturbances of erythrostasis. Haematocrit measurements on the blood, and histological studies of the organs of affected mice support this contention.

See also absts. 1653 (streptococcal mastitis); 1661-1663 (anthrax); 1675 & 1676 (swine erysipelas); 1687 (transplacental immunity in calf paratyphoid); 1695 (salmonellosis); 1701-1702, 1704 & 1706-1708 (brucellosis); 1716 (Cl. haemolyticum); 1741 (trypanosomes); 1749 (Eimeria tenella); 1765 (F. & M. disease); 1772 (rabies); 1777 (rinderpest); 1778 (infectious bovine rhinotracheitis); 1782 (swine fever); 1818 (Forsmann antibody in *A. lumbricoides* infection); 1980-1983 reports, Australia); 1985 (report, Kenya).

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

ROBERTS, I. H., MANSFIELD, M. E. & CMARIK, G. F. (1957). Ineffectiveness against cattle grubs of phenothiazine and stilboestrol in daily diet of fattening steers.—*J. econ. Ent.* 50, 808-809. [Authors' summary modified.]

1799

Phenothiazine in doses of 2 g., stilboestrol in doses of 10 mg., and a combination of both were administered to young steers in the daily diet during a 120-day fattening period. Administration of the drugs began approximately 45 days before the expected arrival of *Hypoderma lineatum* larvae in the subcutis, and continued beyond the time when first-instar larvae ceased to appear in dermal cysts. Extraction of all the larvae from their cysts showed that these drugs, as administered, did not influence the arrival of larvae in the subcutis, nor their survival while in the cysts.

RAUN, E. S. & HERRICK, J. B. (1957). Clinical test of the efficacy of Dow ET-57 for grub control in cattle.—*J. econ. Ent.* 50, 832. [Authors' summary modified.]

1800

In 77 cattle moderately infested with hypoderma larvae, Dow ET-57 administered by capsule 110 days before slaughter killed 94.7% of the grubs. Better weight gains and feed conversion were observed in the treated group than in the controls.

BRUCE, W. N. & DECKER, G. C. (1957). Experiments with several repellent formula-

and immature ascarids and most (89 to 98%) of the small strongyles were removed. Fewer of the large strongyles were removed (34 to 65% of *Strongylus vulgaris*; 0 to 38% of *S. edentatus*). The efficacy against bots ranged from 17 to 100% for *Gasterophilus intestinalis* and 63 to 100% for *G. nasalis*. Activity against immature pinworms was low (0 to 28%), while limited evidence indicated a more complete action (64 to 75%) against the adult forms. There was no evidence of activity against the stomach worms *Trichostrongylus axei* and *Habronema muscae*.

tions applied to cattle for the control of stable flies.—*J. econ. Ent.* 50, 709-713. [Authors' summary modified.]

1801

Repellents R.326 (di-n-propyl isocinchoneronate) and Tabutrex (di-n-butyl succinate) used in base oil sprays on cattle gave better economic control of *Stomoxys calcitrans* than activated pyrethrins. Tabutrex oil solution or emulsion formulations gave 1 to 6 days' residual repellency to the stable fly. Flies temporarily lost their ability to discriminate between treated and untreated animal surfaces after an exposure to mists containing these repellents.

GRAHAM, O. H., WADE, L. L., COLBY, R. W. & MCGREGOR, W. S. (1957). Use of Dow ET-57 for the systemic control of *Dermatobia hominis* in cattle.—*Agric. Chemic.* 12, No. 10, pp. 51 & 109. [Authors' summary modified.]

1802

In tests conducted in Panama with oral administration of Dow ET-57 to cattle for the control of torsalo, 72.6% kill was obtained with a single dose of 100 mg./kg. body wt. The young larvae were very susceptible to treatment, but some of the larger larvae were not killed.

BANNOV, A. T. & SHNEERSON, A. G. (1957). [How sheep scab was eradicated from the Krasnoyarsk territory.]—*Veterinariya, Moscow* 34, No. 9, pp. 43-46. [In Russian.]

1803

In 1945 sheep scab affected 103,000 sheep on 295 (25%) premises in this area. It was

eradicated in April 1957 after repeated spring and autumn dipping in BHC-creolin emulsion.

—R.M.

GAVRICHENKOV, A. I. (1957). [Tick paralysis in sheep.]—*Veterinariya, Moscow* 34, No. 9. pp. 70-71. [In Russian.]

1804

Paralysis of sheep in the mountains of Tadzhikistan, caused by *Ornithodoros lahorensis*, was fatal in 60-70% of cases. Death occurred after 1-2 days' illness in youngstock and after 1-14 days in adults. Dusting of sheep with BHC reduced the incidence of tick paralysis.—R.M.

RICH, G. B. (1957). The ear tick, *Otobius megnini* (Duges) (Acarina : Argasidae), and its record in British Columbia.—*Canad. J. comp. Med.* 21, 415-418.

1805

See also absts. 1911 (toxicity of chlorten aerosol); 1980, 1981 & 1983-1984 (reports, Australia).

PARASITES IN RELATION TO DISEASE [HELMINTHS]

WINTERHALTER, M.; RUKAVINA, J. & LEVI, I. (1957). Intraruminalna aplikacija tetraklorometana (carbonei tetrachloridum) govedima za liječenje metiljavosti. [Intraruminal application of carbon tetrachloride against liver fluke infestation in cattle.]—*Vet. Arhiv* 27, 219-228. [In Croat. English and German summaries.]

1807

Treatment of fascioliasis in cattle by intraruminal injection of CCl_4 produced grave toxic reactions in the liver and was therefore not recommended.—E.G.

MAEGRAITH, B. (1958). Schistosomiasis in China.—*Lancet* January 25th, 208-214.

1808

The conservation of the faeces of domestic animals, especially water buffaloes, constitutes a major problem in the control of human schistosomiasis, caused by *Schistosoma japonicum*. Control measures include: mass treatment of overt infection with a view to bringing clinical relief and reducing the output of infective ova in the faeces; prevention of water pollution; and destruction of miracidia and cercariae and the intermediate snail host, *Oncomelania*. Chemical control and physical methods of killing snails are reviewed. The use of chemical agents is largely restricted by cost and/or toxicity to human beings and animals. During the summer snails are found on land within $1\frac{1}{2}$ -2metres from the water line and spraying, scalding and burning of this area are all effective. Spraying with poisonous chemicals is restricted to ditches and canals in the fields. Burying of mud containing snails is another effective measure.—T.E.G.R.

The ear tick has a wide distribution and is native to many parts of North and South America, but in Canada has been recorded only in the south-eastern part of British Columbia. While primarily a parasite of ungulates, it has a wide range of hosts, including man. In 1955 and 1956, heavy infestation in cattle was responsible for a number of deaths. Symptoms were 'head-heaviness', loss of appetite, muscular incoordination and final collapse.

—R. V. L. WALKER.

SUTTER, M. D. (1958). Arachnid infection in monkey lungs.—*Vet. Med.* 53, 41.

1806

Coughing in monkeys was due to pulmonary infestation with *Pneumonyssus foxi*. The lesions resembled those of tuberculosis.—R.M.

CHANG-LING LEE & LEWERT, R. M. (1957). Studies on the presence of mucopolysaccharidase in penetrating helminth larvae.—*J. infect. Dis.* 101, 287-294. [Authors' summary modified.]

1809

Attempts were made to find mucopolysaccharidase activity in extracts of larvae of *S. mansoni*, *S. ratti*, *A. caninum* and *N. muris*, using turbidimetric and colorimetric methods of determination as well as the streptococcal decapsulation test. Bovine hyaluronidase was used as a positive control for activity against hyaluronic acid and chondroitin sulphuric acid, while *C. welchii* toxin served as a positive control for activity against heparin and ovomucin. The extract of *S. mansoni* cercariae showed a high level of activity against the heparin substrate but neither it nor any of the other helminth extracts were capable of degrading the other specific substrates tested. All the helminth extracts including those with no collagenase activity altered the streptococcal capsules to some degree. The possible relationship of mucopolysaccharidase activity to penetration mechanism is discussed.

GRÉTIILLAT, S. (1957). Note préliminaire sur la gastrothylose des jeunes zébus à Madagascar. [Infection of cattle in Madagascar with the trematode parasite *Carmyrius dollfusi*.]—*Rev. Élev.* 10, 221-230. [English summary.]

1810

Large numbers of *Carmyrius dollfusi* (Gastrothylacidae) parasitic in the rumen of zebu cattle, one to two and a half years old, gave

rise to symptoms of anaemia, emaciation and foetid diarrhoea. *In vitro* tests showed that 'Verbutane' (a mixture of dichlorbutane and chlorbutene) in both liquid and vapour states killed the flukes. Carbon tetrachloride, tetrachlorethylene, phenothiazine, piperazine dithiocarbamate and piperazine adipate were all less effective than 'Verbutane' *in vitro*. Treatment of affected animals with doses of 20 to 45 ml. 'Verbutane' by mouth following 24 to 36 hours' starvation was satisfactory. The other drugs were not tried *in vivo*. [Since carbon tetrachloride is known to be relatively inactive *in vitro* against *Fasciola hepatica* it is perhaps not altogether satisfactory to assess the anti-trematode activity of drugs by such means alone.] Since the intermediate host or hosts of *Carmyérius* spp. are unknown the only applicable control method is prophylactic treatment of the final host. [See also V.B. 28, 795.]

—H. SCOTT McTAGGART.

GEMMELL, M. A. (1957). Hydatid disease in Australia. II. Observations on the geographical distribution of *Echinococcus granulosus* (Batsch 1786) (Rudolphi, 1805) in the dog in New South Wales.—*Aust. vet. J.* 33, 217-226. **1811**

From an examination of 561 dogs, it was shown that the incidence of infestation with *E. granulosus* declined from 1 in every 3 sheep dogs in the Southern Tablelands, to 1 in every 4 in the South Western Slopes and 1 in every 5 or 6 in the Central Tablelands. This was not true of rabbiting dogs however, unless they lived largely on sheep offal. The dogs examined came from 114 separate properties, half of which carried one or more infested animals. The proportion of properties with only one infested dog was similar in the three geographical regions studied, but the proportion of properties with more than one infested dog differed from region to region. Variation in the degree of infestation in dogs was similar in the three regions.

—R. I. SOMMERVILLE.

GEMMELL, M. A. (1957). The fox as a host of *Echinococcus* spp and its possible rôle in the spread of hydatid disease.—*Vet. Rec.* 69, 1018-1020. **1812**

G. reviewed work which showed that the fox is not a definitive host of *E. granulosus*. He questioned Sinclair's (1956) [*Vet. Rec.* 68, 104] report of finding 5 infested foxes and suggested that the cestodes may have been *E. multilocularis*, which in its larval stages infests microtine rodents. Now that myxomatosis has reduced the rabbit population foxes may depend more on small rodents for food and the incidence of alve-

olar hydatid disease in man may increase because of the possibility of foxes coming into closer contact with man.—D. POYNTER.

UL'YANOV, S. D. (1957). [Anthelmintic treatment of *Avitellina* and *Thysanosoma* infestations in sheep.]—*Veterinariya, Moscow* 34, No. 5. pp. 32-35. [In Russian.] **1813**

Aminoacriquine was about 80% efficient against these cestodes when given orally at a dosage of 0·1 g./kg. body wt. A dosage of 0·15 g./kg. was toxic for sheep. Tin arsenate was moderately effective at 0·7-1 g. per sheep. Kamala had little action and mepacrine had no action against the cestodes.—R.M.

ROWLAND, M. E. & RENDTORFF, R. C. (1957). Failure to transmit mouse leukemia by *Trichinella*.—*J. Parasit.* 43, 412. **1814**

T. spiralis larvae were recovered from leukaemic mice. Three mice were given 200, 300 and 375 of these larvae respectively by mouth, whilst 23 mice received suspensions of 400-2000 ground larvae each. Despite observation for 60 days no leukaemia was detected.—D. POYNTER.

RIEK, R. F. & KEITH, R. K. (1958). Studies on anthelmintics for cattle: III. The efficiency of some piperazine compounds.—*Aust. vet. J.* 34, 1-4. [Authors' summary modified.] **1815**

Piperazine hydrate was highly effective against *Oesophagostomum radiatum* at a dose rate of 3 g./100 lb. body wt., but had little value against *Haemonchus placei*, *Cooperia* spp., *Trichostrongylus axei* and *Bunostomum phlebotomum*, even at 20 g./100 lb. body wt. Premedication with sodium bicarbonate immediately before treatment did not increase the anthelmintic efficiency of this drug. Piperazine-1-carbodithioic betaine when administered by mouth at the same dose rates had an anthelmintic activity similar to piperazine hydrate. When injected directly into the abomasum at 20 g./100 lb. body wt. it was also highly effective against *H. placei* and *Cooperia* spp., but remained ineffective against *T. axei*. The increased anthelmintic efficiency is probably due to the carbon disulphide liberated in the abomasum.

MICHEL, J. F. (1957). Further experiments on the epidemiology of parasitic bronchitis in calves.—*Vet. Rec.* 69, 1118-1121. [Author's summary modified.] **1816**

Experiments are described which show that the infection of lungworm acquired by a grazing calf depends on the herbage infestation during a short initial period only, if changes in the rate of uptake of larvae from the pasture are contin-

uous. In situations where abrupt changes can occur a calf may suffer disease as a result of infective larvae which it itself has passed on to the pasture. A number of important implications of this finding are discussed.

LONG, P. L. (1957). An account of a serious infestation with gapeworms (*Syngamus trachea*) in growing turkeys.—*World's Poult. Sci. J.* **13**, 288-290. 1817

An outbreak of gapeworm disease is described, in a flock of 2,000 turkeys kept in groups of about 50 in partly roofed earth floored straw yards. The most severely affected birds were 12-14 weeks old. Enormous numbers of earthworms, (*Eisenia foetida*), were found below the straw litter. When week-old White Leghorn chicks were fed on these worms they became infected with *Syngamus*. Treatment of the earth floors with 'Mowrah' meal at a rate of 6 oz. per sq. yard appeared to be highly effective against the earthworms, but some infective earthworms were recovered six months later. Treatment of the turkeys with barium antimonyl tartrate in a small wooden hut was not very successful.—H. SCOTT McTAGGART.

SOULSBY, E. J. L. (1958). Studies on the heterophile antibodies associated with helminth infections. I. Heterophile antibody in *Ascaris lumbricoides* infection in rabbits.—*J. comp. Path.* **68**, 71-81. [Author's conclusions modified.] 1818

Forssman antibody increased in titre during *A. lumbricoides* infection in the rabbit. The homologous antigen was present in the tissues, chiefly the intestine of the adult worm, and in an extract of larvae; also in the excretions and secretions obtained from the larvae. Using the secondary response to an established Forssman antibody system *in vivo* it was possible to indicate that the period of the second ecdysis of ascaris larvae was the earliest period at which to expect a marked release of antigens. The Forssman antibody had no protective action against infection.

SCHACHER, J. F. (1957). A contribution to the life history and larval morphology of *Toxocara canis*.—*J. Parasit.* **43**, 599-612. 1819

The morphology of the five developmental stages of *T. canis* is figured and described. A discussion on the life-cycles and the morphology of this and related species is given.

—D. POYNTER.

KUME, S. (1957). Chemotherapy of canine filariasis.—*Amer. J. vet. Res.* **18**, 912-923. [Author's summary modified.] 1820

The principal activity of the substituted

piperazines and the organic antimonials, in filariasis, is against the microfilariae. The piperazine failed, in a limited number of dogs, to affect adult filariae. The activity of the antimonials against the adult worms was slow and uncertain and even the doses which caused delayed destruction of the worms were toxic. No filaricidal activity was demonstrated for acriflavine, naphthalene, formalin, or the organic compounds of mercury and bismuth. The marked activity of the organic arsenicals against the adult heartworm (*Dirofilaria immitis*) was confirmed. Dichlorophenarsine hydrochloride, hitherto untried against this infection, was active against the adult worms and well tolerated by the dog. Its action appeared to be more rapid than that of thiacetarsamide since 2 or 3 daily doses killed all the adult worms. Three daily doses of 1 mg. of arsenic per kg. body wt. destroyed adult worms in 10 days; with 2 such doses, their destruction appeared to be slower.

BANKS, A. W. (1958). Epidemiology of helminth infestation in sheep. South Australian aspects.—*Aust. vet. J.* **34**, 20-27. [Author's summary copied verbatim.] 1821

For climatic reasons, most lambing occurs in autumn in South Australia. Parasitic infection follows a simple pattern, beginning very early in the life of the lamb, reaching a peak in about 5-6 months, and then declining, with strong residual immunity. Nutrition is of small importance in this process. *Trichostrongylus* is the only parasite of regular importance, and its overall effect is slight. *Haemonchus* occurs occasionally and can be serious. *Chabertia* is of low pathogenicity. A routine drenching programme is of doubtful economic value. Certainly no more is indicated than one treatment at weaning time, using phenothiazine in much larger doses than usually recommended. Infections with liver fluke and with *Cysticercus tenuicollis* present some peculiar features.

I. ELLIOTT, D. C., THOMAS, P. L. & O'GRADY, B. (1957). A comparison of the effects of copper methylarsenate and finely ground phenothiazine on worms in sheep.—*N.Z. J. Agric.* **95**, 601. 1822

II. SALISBURY, R. M. & STAPLES, E. L. J. (1957). Toxicity of copper methylarsenate to sheep.—*Ibid.* 601-602. 1823

I. In a controlled experiment involving three groups of 14 hoggets (average weight 53·7 lb.) with mixed worm infestations, the effectiveness of a single dose of 2·08 g. copper methylarsenate per sheep was compared with that of a single dose of 20 g. of fine phenothiazine. Post-mortem worm counts were carried out several

days after dosing. Copper methylarsenate was completely effective in removing *Moniezia expansa* and about as effective as phenothiazine in removing *Haemonchus contortus*, but against other species it was relatively ineffective or gave inconclusive results, whereas phenothiazine removed a high percentage of the total worm burden.

II. Experiments were carried out to assess the toxicity of copper methylarsenate for lambs. It was concluded that under normal conditions the toxic ratio is reasonably safe, but that if stock are deprived of adequate water supplies the normal rapid excretion of the arsenic by the kidneys is prevented, with resultant kidney damage which may prove fatal. Since such conditions are liable to occur in the field in New Zealand the margin of safety is regarded as far too slender for the drug to be recommended for general use.—H. SCOTT McTAGGART.

GOLUBEV, N. F. (1957). [Attempt to free sheep from helminths on collective farms of the Leningrad oblast.] — *Veterinariya, Moscow* 34, No. 5, pp. 36-40. [In Russian. Translation of author's summary, slightly modified.]

1824

Two anthelmintic treatments at planned intervals and change of pasture at least every 2 weeks, coupled with simultaneous anthelmintic treatment of cattle on the same farm, reduced helminth infestation within a relatively short time and almost eradicated liver flukes. Administration of a 1:10 phenothiazine-salt mixture during the pasturing period at the rate of 1 g. per day for adult sheep and 0.5 g./day for lambs

See also absts. 1827 (Opisthorchis felineus); 1980-1984 (reports, Australia); 1985 (report, Kenya).

SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS]

BEZUGLOV, T. M. (1957). [Neoplasms in animals.] — *Veterinariya, Moscow* 34, No. 7, pp. 58-63. [In Russian.]

1827

A brief review of the incidence of neoplasms in animals and the value of a comparative study of neoplasms. Apart from some well-known references from world literature, B. gave data from the department of pathological anatomy of Leningrad Veterinary Institute for the period 1924-40. Neoplasms were recorded in 187 out of 2,200 dogs (45 male and 142 female), of which 155 were malignant and 32 benign. Among the former were 57 carcinomas and 98 sarcomas. The majority (81%) of the neoplasms were of the urogenital system. Neoplasms were found in 57 of 1,838 cats, 45.5% being carcinoma and 26.3% sarcoma. The common occurrence of neo-

plasms of the bile duct and pancreas may be related to *Opisthorchis felineus* infestation. 10% of fowls examined had neoplasms. Of sarcomata 42.9% affected the ovary and 33% the bursa of Fabricius. The proportion of sarcoma to carcinoma was 6.5:4.5.—R.M.

SPEDDING, C. R. W., BROWN, T. H. & WILSON, I. A. N. (1958). Growth and reproduction in worm-free sheep at pasture.—*Nature, Lond.* 181, 168-170.

1825

The growth of 13 "worm-free" ewe lambs (group F), was compared with that of 15 infected ewe lambs, (group I). At mating time the individuals of group F were on average 17 lb. per head, and at lambing time 32 lb. per head, heavier than those of group I. Also at lambing time the udder width of animals in group F exceeded that in group I by 6.5%. Group F produced heavier single lambs. It is suggested that the effect of a moderate degree of worm infestation on the growth of ewes is similar to that found for other sheep but that in pregnant ewe lambs the effect may devolve entirely on the developing foetus and the associated maternal tissues.—D. POYNTER.

WORLEY, D. E. (1957). The effect of a single dose of Trolene (ET-57, Dow Chemical) on fecal egg counts in wintering Hereford cattle. — *J. Parasit.* 43, 632.

1826

Reductions in low egg counts were seen when 21 yearling cattle were given Trolene (0,0-dimethyl 0-2, 4, 5-trichlorophenyl phosphorothiolate), in a single oral dose at 110 mg. per kg.—D. POYNTER.

plasmas of the bile duct and pancreas may be related to *Opisthorchis felineus* infestation. 10% of fowls examined had neoplasms. Of sarcomata 42.9% affected the ovary and 33% the bursa of Fabricius. The proportion of sarcoma to carcinoma was 6.5:4.5.—R.M.

COTCHIN, E. (1958). Mammary neoplasms of the bitch. — *J. comp. Path.* 68, 1-22. [Author's conclusions modified.]

1828

An account is given of the pathology of mammary tumours from 424 bitches. There were 249 benign tumours. Of these, 11 were of connective tissue type and 8 were simple adenomas. The other 230 benign tumours showed varying degrees of complexity, generally with proliferation of "interposed cells", that is, of

cells characteristically interposed between luminal epithelium and basement membrane or intralobular connective tissue. There was often a formation of mucoid, chondroid, or bony tissue: 40 of the benign complex tumours contained bone, an additional 63 contained cartilage but no bone, and a further 67 showed mucoid tissue, but no cartilage or bone. C. suggested that the interposed cells were myoepithelial cells.

The complex tumours included papillary cystadenomas and mixed tumours. Their histogenesis was discussed. There was predominant proliferation of myoepithelial cells, which tended to become embedded in a mucoid, or chondroid, matrix. Some cartilage was formed in relation to myoepithelial cells, some by metaplasia of connective tissue. The bone in the tumours appeared to be formed either by endochondral ossification of preformed cartilage, or by intramembranous ossification in the connective tissue of the tumour.

The 187 malignant tumours were classified as carcinomas (87), sarcomas (73) and complex

malignant tumours (27). Metastases were present in 41 of the 424 bitches.

MEDEROS, R., NUÑEZ MARTINEZ, E. & BELLO, J. (1957). Polimegadenopatías malignas primitivas del tejido linfoideo en perros. (Linfosarcomatosis tipo Kundrat). [Lymphosarcomatosis in two dogs.]—*An. Fac. Vet. Montevideo* 6, No. 4. pp. 63-89. [English and French summaries.]

1829

A clinical study of two dogs with generalized enlargement of lymph nodes. Diagnosis of lymphosarcomatosis was based on histological examination of blood, bone marrow, lymph nodes and other body tissues.—R.M.

CORDY, D. R. (1957). Plasma cell myeloma in a dog.—*Cornell Vet.* 47, 498-502. [Author's summary modified.]

1830

The case described was believed to be the sixth reported case of plasma cell myeloma in the dog. It was presumed to be of the solitary type. Arising in the first lumbar vertebra, it caused compression of the spinal cord.

See also absts. 1981 & 1983 (reports, Australia).

NUTRITIONAL AND METABOLIC DISORDERS

JOHNS, A. T. (1957). The influence of high production pasture on animal health.—*Proc. VIIth Int. Grassl. Congr., Palmerston North, 1956*. pp. 251-260. Discussion: pp. 260-261.

1831

J. discussed the possible relationship between types of pasture and some of the main metabolic and deficiency diseases encountered in New Zealand. In New Zealand the protein content of ryegrass-white clover swards can be very high especially in the winter and early spring, and associated with the high potassium levels also found at this time, may play a part in the aetiology of hypomagnesaemia. The cyanide and iodine content of white clover and the iodine content of ryegrass vary according to the strain; this could be of great significance in relation to goitre. The various theories on bloat and on facial eczema and unthriftiness in young sheep were considered. The last two conditions seem to be linked with rapidly growing ryegrass in the autumn. Ketosis, and the part played by the various fatty acids in this disease, were discussed.—E. J. CASTLE.

HEAD, M. J. & ROOK, J. A. F. (1957). Some effects of spring grass on rumen digestion and the metabolism of the dairy cow.—*Proc. Nutr. Soc.* 16, 25-30.

1832

The ammonia content of rumen liquor in

cows grazing spring grass is much higher than in cows on winter rations, and it is associated with a considerable rise in serum urea and blood ammonia. The introduction of starch through a ruminal fistula reduced all of these and also the amount of nitrogen excreted in the urine. The authors postulate that the high rumen ammonia content affects the utilization of herbage magnesium. Hypomagnesaemia was most severe in groups of cows having the highest serum non-protein nitrogen and blood ammonium levels. An increase in serum magnesium levels was brought about in cows with hypomagnesaemia by the introduction of starch into the rumen.

—E. J. CASTLE.

ROY, J. H. B., HUFFMAN, C. F. & REINEKE, E. P. (1957). The basal metabolism of the newborn calf.—*Brit. J. Nutr.* 11, 373-381. [Authors' summary slightly modified.]

1833

Four Holstein-Friesian calves, removed from their dams before suckling, were given colostrum and then reared on a standard amount of milk for the first 3 weeks of life. Basal-metabolism determinations with a closed-circuit spirometer were made on the four calves 15 hours after a meal, usually at daily intervals for the first 10 days of life and thereafter on alternate days. Heat production increased for the first 2-4 days of life, then fell rapidly until the 8th day,

and thereafter more slowly. The fall in heat production from the third day of life was closely related to the fall in pulse rate.

BLAXTER, K. L. (1957). The effects of defective nutrition during pregnancy in farm livestock.—*Proc. Nutr. Soc.* 16, 52-58. 1834

Low reproductive performance is more commonly attributable to a deficiency in total food energy than to a specific mineral or vitamin deficiency. Undernutrition can result in a failure to exhibit oestrus. An increase in the number of stillbirths and neonatal deaths, low birth weight, a reduction in milk yield and, in ewes, a reduction in wool growth, can be the result of malnutrition in pregnancy.—E. J. CASTLE.

BELLIS, D. B. (1957). Some problems in the nutrition of the baby pig.—*Proc. Nutr. Soc.* 16, 98-102. 1835

Young pigs over 5 weeks of age can be reared artificially without difficulty, and with care even those over 3 days old can be reared. The full details of diets suitable for pigs of these ages are given. Pigs only 3 days old do not grow well for the first two weeks and their food conversion rate at this age is poor. This may be due to the fact that the activity of some of the digestive enzymes has not reached a maximum.—E. J. CASTLE.

PATERSON, J. S. (1957). The role of an adequate diet in the production of healthy guinea-pigs.—*Proc. Nutr. Soc.* 16, 83-87. 1836

P. emphasized the importance of diet in the successful breeding of g.pigs. The diet should consist of a suitable concentrate mixture, green food to provide vitamins C and E, hay and water. He gave details of two concentrate mixtures, one suitable for pelleting. Breeding stock deprived of hay develop a condition in which all their teeth grow very rapidly and eventually stop jaw movement. P. appealed for information about a condition known as "soft-tissue calcification", which he described.

—E. J. CASTLE.

COWLISHAW, S. J. & EYLES, D. E. (1957). The nutritive value of herbage for poultry.—*Nutr. Abstr. Rev.* 27, 983-996. 1837

Recent research has indicated that young chicks eat very little grass, but when growing and laying pullets have normal high density mash and grain diets, access to young herbage reduces the feed intake by up to 10% and even, with laying birds, by 20%. Herbage is a good source of carotene, vitamins E and K, iron and copper, and is the cheapest form of good protein, but it is not a good source of riboflavin, folic

acid, vitamin D, calcium or phosphorus and is sometimes low in biotin, choline, and manganese. Young herbage with grain, preferably wheat, and minerals (calcium, phosphorus and salt) is enough for growing and laying pullets but it is advisable to provide the vitamins and minerals which are lacking in herbage.

—A. ACKROYD.

O'DELL, B. L., REGAN, W. O. & HOGAN, A. G. (1957). Chlortetracycline in the nutrition of guinea pigs.—*Proc. Soc. exp. Biol., N.Y.* 96, 553-555. [Authors' summary modified.] 1838

Chlortetracycline hydrochloride was included in various diets of a g.pig colony for 3 years without evidence of toxicity. It had no effect on growth rate and caused no mortality when added to a purified diet at concentrations of 25 to 200 mg./kg. At the routine level of 25 mg./kg. it decreased abortions and adult mortality and eliminated cervical lymphadenitis.

WESTERMARCK, H. & TOIVANEN, E. (1957). Antibioottien vaikutuksesta kananpoikasten kehitykseen ja kasvuun. [The effect of antibiotics on the growth rate of chickens.] —*Finsk VetTidskr.* 63, 652-656. [In Finnish.] 1839

Aureomycin was fed (as "Aurofac", 0.7 kg. per 100 kg.) to 373 chickens kept on a floor heavily infested with coccidia. In this group 5.4% died during 2 months as compared with 10.7% in the control group. The growth rate was 20% better in the antibiotic group than in the control. When "Aurofac" (1.4 kg./100 kg.) was added to the food of chickens in a pen in which coccidiosis had killed 4.3%, the outbreak was controlled.

BALDISSERA NORDIO, C. & ANTALDI, G. V. (1957). Effetti delle miscele alimentari protette con DPPD sull'accrescimento e sulla pigmentazione dei polli. [Effects of DPPD (n-n'-diphenyl-p-phenylenediamine) on growth and pigmentation in fowls.] —*Atti Soc. Ital. Sci. vet., Perugia 1956* 10, 226-229. [English and French summaries.] 1840

DPPD (n-n'-diphenyl-p-phenylenediamine) was added, in the proportion of 0.2%, to the mixed dry feed of chicks; a control group was kept on the unsupplemented ration. In the experimental group the general condition of the birds was better, the plumage brighter and higher weight gains were recorded; there was a greater quantity of subcutaneous fat and deeper coloration of the skin and legs; in 100 g. of skin (containing 37.044% fat) the carotene and carotenoid contents were 324.05 and 375.264 µg.

respectively, compared with 92.25 and 61.49 µg. per 100 g. of skin containing 23.481% fat in controls. The treated feed, after 6 months, had a higher carotene content than the untreated mixture.—T.E.G.R.

I. REID, C. S. W. & JOHNS, A. T. (1957).

Bloat in cattle on red clover. III. Treatment and prevention with anti-foaming agents.—*N.Z. J. Sci. Tech. Sect. A.* **38**, 908-927. [Authors' summary modified.]

1841

II. MANGAN, J. L. & JOHNS, A. T. (1957).

Bloat in cattle. IV. A comparison of the chemical composition and foaming properties of extracts of bloating and non-bloating clover.—*Ibid.* 956-965. [Authors' summary slightly modified.]

1842

I. Bloat in cows on red clover was successfully treated with anti-foaming agents, including vegetable oils (peanut, raw linseed, soya-bean and olive), vegetable turpentine, emulsified tallow, whale oil, cream, lanoline, five formulations of liquid paraffin, and two types of paraffin-wax emulsion. Anti-foaming agents giving variable results were a ricinoleic acid derivative, silicone preparations, detergents, and diethyl ether. Glycerol proved ineffective. Treatments without anti-foaming action failed to give relief. These included sal volatile, adrenaline, mepyramine maleate, sodium bicarbonate, ferric chloride, sodium thiosulphate, and a preparation containing acetotrimethylcolchicinic acid. The vegetable oils were shown to be as effective as turpentine without being irritant. The minimum effective dose of the vegetable oils, whale oil, vegetable turpentine, and liquid paraffins, was below 50 ml. while that of emulsified tallow was about 30 g. The requirements of an agent for use as a remedy in the field are discussed. The agents with the most desirable properties appear to be peanut oil and emulsified tallow. Dose rates of 120 ml. (4 fl. oz.) of the oil or 90 g. of tallow are suggested. Bloat was prevented by the administration of anti-foaming agents before feeding. However, protection lasted only for the feed following treatment; and, except by greatly increasing the dose, no method of administration was found that would ensure protection at a subsequent feed. When bloat was prevented, intake of potent herbage was as high as that of safe herbage, without detectable ill-effects, except in the case of very light paraffins. A number of cases of bloat on short-rotation ryegrass were successfully treated with the same vegetable oils which were effective in preventing bloat on this feed. The mechanism of action of anti-foaming agents is discussed, also the limitations of these substances in the treatment.

II. The authors devised a serial-dilution technique for comparing the foaming properties of extracts of bloating and non-bloating clover. A crude plant macerate was fractionated into extracts containing: (A) Soluble protein, "saponin", and chloroplasts; (B) Soluble protein and "saponin"; (C) "Saponin". When tested under optimum conditions of pH and salt concentration, none of these factors showed any relationship in foaming properties with the bloat-promoting potential of the fresh clover. The only satisfactory method of preserving the foaming properties of the fresh clover was by deep freezing. Any procedure which included drying destroyed these properties and denatured the soluble protein. An analysis was made of the organic-acid and soluble-sugar levels in bloating and non-bloating clover.

BROBERG, G. (1957). **Measurements of the redox potential in rumen contents. I. In vitro measurements on healthy animals. II. In vitro measurements on sick animals. III. Investigations into the effect of oxygen on the redox potential and quantitative in vitro determinations of the capacity of rumen contents to consume oxygen.**—*Nord. VetMed.* **9**, 918-930; 931-941 & 942-950. [In English. German and Swedish summaries.]

1843

Measuring the redox potential directly in sheep through a well-closed rumen fistula, the tension between a bright platinum electrode and a calomel electrode can vary between -350 and -500. In most cases it is around -400. Thus anaerobic conditions prevail in the rumen. Oxygen, applied to rumen content *in vitro* and *in vivo*, is rapidly consumed by the rumen micro-organisms with facultative anaerobic properties.—H. WESTERMARCK.

PERRIN, D. R. (1958). **The chemical composition of the colostrum and milk of the ewe.**—*J. Dairy Res.* **25**, 70-74. [Author's summary modified.]

1844

The composition of the milk of six poorly-fed and six well-fed ewes was studied. Definite lactational trends were observed for all the major constituents. The initial colostrum of all the ewes was very high in protein and fat and low in lactose. Analyses of the mineral constituents (Ca, Mg, Na, K, P and Cl) were reported covering the whole lactation of 12 sheep. The colostrum of the poorly-fed animals had a higher total mineral content than that of the well-fed animals.

MCKENZIE, D. A., BOOKER, E. M. K. & MOORE, W. (1958). **Observations on the cell count and solids-not-fat content of cows' milk.**—*J.*

Dairy Res. 25, 52-59. [Authors' summary copied verbatim.] 1845

Tests over a 2-year period of milk from an Ayrshire herd showed that there was a greater incidence of low S.N.F. [solids-not-fat] in milk with a high cell count compared with milk of a low cell count. While a wide variation in S.N.F. was found at any particular cell count, there was a broad correlation between cell counts and S.N.F., the average S.N.F. for cows in the same lactation being lower for those animals with high cell counts in the milk. It was suggested that a cell count above 100,000/ml. in bulk milk should be regarded as significant. Bacteriological examination of samples with high cell count showed that in a large proportion of cases no typical mastitis-producing organism could be isolated.

BARNETT, A. J. G. (the late) & Dow, M. G. C. M. (1957). Utilization of carbohydrate metabolites by rumen micro-organisms.—*Nature, Lond.* 180, 548-549. 1846

The *in vitro* production of volatile fatty acids was measured when rumen liquor from freshly slaughtered animals was incubated for 72 hours in a mineral salt medium at pH 6.7 and 39°C. in an atmosphere of CO₂. Pyruvate, lactate and α-ketoglutarate acted as sole sources of added carbon substrate. It was observed that acetic acid is produced in greater amount than propionic acid from pyruvate, whereas propionic acid is the chief acid derived from lactate. Pyruvic acid and lactic acid differ also in respect of butyric acid production, and α-ketoglutarate gives a low total production of volatile fatty acids, mainly acetic and propionic acids.

—D. S. PAPWORTH.

FISHER, H. & LEVEILLE, G. A. (1957). Observations on the cholesterol, linoleic and linolenic acid content of eggs as influenced by dietary fats.—*J. Nutr.* 63, 119-129. [Authors' summary modified.] 1847

A practical means of incorporating large amounts of fat into a poultry ration without making it unpalatable because of oiliness, has been achieved through the addition of an absorbent to the diet. In this manner, the effects of tallow, corn, soya bean, safflower and linseed oil were studied in terms of the linoleic and linolenic acid composition of the egg fat. Linseed oil produced a large increase in both the linoleic and linolenic acid content of egg fat, whereas soya bean and safflower oil increased only the linoleic acid content, despite the fact that soya bean oil contains 7 to 8% of linolenic acid. The cholesterol content of egg fat was essentially unchanged by alterations in the fatty acid composition.

RHODES, D. N. (1958). The effect of cod-liver oil in the diet on the composition of hen's egg phospholipids.—*Biochem. J.* 68, 380-384. [Abst. from author's summary.] 1848

The addition of 10 g. of cod-liver oil/day to the diet of a laying hen increased the unsaturation of the neutral fat and more particularly of the phospholipids of the egg yolk. The polyethenoid acids of the fish oil were selectively incorporated into the phospholipids apparently at the expense of the monoethenoid and diethenoid acids normally present.

CARROLL, K. K. & NOBLE, R. L. (1957). Influence of a dietary supplement of erucic acid and other fatty acids on fertility in the rat.—*Canad. J. Biochem. Physiol.* 35, 1093-1105. 1849

Despite normal growth rate and an apparent excellent state of health, young male rats reared on a stock powdered diet with a supplement of 10% or more by weight of erucic acid, had a progressive reduction in spermatogenesis and became completely sterile after about 20 weeks. A similar effect was evident in adult rats on the same diet. Recovery of spermatogenesis was noted if testicular degeneration had not advanced too far; impairment of spermatogenesis appeared to be a specific effect of the erucic acid in the diet. Female rats on the same diet exhibited no disturbance in the oestrous cycle, but there was some interference with parturition and early death of the offspring was due to deficient mammary development and loss of lactation. A similar diet with 15% oleic acid (by weight) resulted in the same impairment. These defects are similar to those occurring in animals fed a diet deficient in essential fatty acids. It may be possible that erucic acid interferes with reproduction by affecting the metabolism of the essential fatty acids.—R. V. L. WALKER.

MCLAREN, D. S. (1957). Chronic protein deficiency and some congenital abnormalities of the eye of the rat.—*Proc. Nutr. Soc.* 16, No. 2. xxiii-xxiv. of Proceedings. 1850

Abnormalities of the eye, especially of the lens, were observed in the litter of a female rat reared, and thereafter maintained, on a low protein diet. Two subsequent litters, born after a normal diet had been resumed, showed less eye abnormality. A fourth litter was normal.

—E. J. CASTLE.

CLOSS, K. (1957). Polythionate — A new reagent for the detection and determination of protein in urine.—*Scand. J. clin. lab. Invest.* 9, 349-355. [Author's summary modified.] 1851

A new reagent for the detection and quantitative determination of pathological amounts of protein in the urine is described. It consists of a dilute acid solution of an alkali polythionate (pH 1.5-2.0). One part of urine is mixed with ten parts of reagent and the turbidity produced after half an hour is either evaluated by inspection (qualitative test) or measured in a suitable colorimeter (quantitative reaction). The protein content of urine samples assessed according to the new technique compared favourably with results obtained by the biuret and micro-Kjeldahl methods.

MOIR, R. J. (1957). Nitrogen metabolism in ruminant digestion.—*Aust. vet. J.* 33, 287-291. **1852**

This reviews information from 54 published references.—A. G. CULLEY.

MAZURCZAK, J. (1957). Oznaczanie aminokwasów w moczu koni. [Amino-acids in horse urine.]—*Méd. vét., Varsovie* 13, 600-602. [In Polish. English and Russian summaries.] **1853**

In order to determine amino-acids in horses' urine M. used a combined method of ionophoresis and chromatography. Ionophoretic separation yielded groups of acid, neutral and basic amino-acids; these groups were separated by the use of paper chromatography and the following amino-acids identified: asparagine, glutamic acid, cystine, serine, glycine, threonine, alanine, leucine, isoleucine, while the presence of valine and methionine was also suspected. M. concluded that inorganic compounds and urea should be removed before using the chromatography method for the determination of amino-acids in equine urine.—M. GITTER.

NATHANS, D., FAHEY, J. L. & SHIP, A. G. (1958). Sites of origin and removal of blood ammonia formed during glycine infusion: effect of L-arginine.—*J. Lab. clin. Med.* 51, 124-133. [Authors' summary modified.] **1854**

In the normal fasted dog ammonia was added to the blood in the kidneys and portal bed and was removed in the liver. Glycine infused i/v resulted in release of ammonia into the blood in the liver and additional ammonia release by the kidneys, with concomitant rise in the arterial ammonia concentration. At high arterial levels ammonia was removed in the extremities and head. When L-arginine was injected i/v during the glycine infusion, the liver ceased abruptly to release ammonia and removed ammonia from the incoming blood. A rapid fall in arterial ammonia concentration occurred. Arginine did not affect ammonia release or

removal by any organ tested other than the liver. The possible therapeutic significance of the capacity of L-arginine to prevent ammonia release at an important site of ammonia formation is discussed.

UNDERWOOD, E. J. (1957). Trace elements in ruminant nutrition.—*Aust. vet. J.* 33, 283-286. **1855**

Grazing animals differ from others in that they depend upon the whole plant for their nutrient. The author discussed (a) differences among plant species in trace element concentrations, and the consequent possible effect of plant species in a pasture on trace element problems in ruminants; (b) the importance of soil type, and soil-plant-animal interrelationships, with mention of boron, iodine, cobalt, copper, zinc and manganese; (c) the importance of considering interactions among the trace elements and all other components of the animal's diet.

—A. CULEY.

TAYLOR, N. H., CUNNINGHAM, I. J. & DAVIES, E. B. (1957). Soil type in relation to mineral deficiencies.—*Proc. VIIth Int. Grassl. Congr., Palmerston North*, 1956 pp. 357-366. Discussion: pp. 366-367. **1856**

The soil type can often serve as a useful guide to the likelihood of a mineral deficiency. The authors gave criteria for deficiency of cobalt and copper and for excess of molybdenum, and listed various places in New Zealand where these conditions are found. They described methods generally employed to counteract cobalt and copper deficiencies and mentioned farming methods which are likely to upset mineral balance.—E. J. CASTLE.

DUNSTONE, J. R. (1957). The direct determination of calcium in biological material.—*Med. J. Aust.* October 19th, 571-572. [Author's summary modified.] **1857**

A modification of Fales's procedure [V.B. 24, 2136] is presented (range 20 to 200 µg. of calcium). Biological material of medium or high phosphate content can be analysed without the prior removal of phosphate.

CAMPBELL, W. R. (1957). The estimation of calcium and magnesium.—*Canad. J. Biochem. Physiol.* 35, 1033-1046. **1858**

A device for measuring calcium and magnesium in body fluids with versene and organic dyes is described, and includes the methods of operating the instrument, purifying the reagents and preparing standards. The method is considered to be more precise than older methods,

requiring less time, and with modifications may be made applicable in testing water samples for hardness due to these metals.

—R. V. L. WALKER.

VANSCHOUBROEK, F. & BOUQUET, Y. (1957). Onderzoek naar het magnesiumgehalte van koemelk in verband met eventuele hypomagnesaemie bij mestkalveren. [Magnesium content of cow's milk in relation to hypomagnesaemia in veal calves.]—*Vlaam. diergeneesk. Tijdschr.* **26**, 153-170. [In Flemish. English, French and German summaries.]

1859

In order to prevent the amount of Mg in the blood of calves falling below 0·8 mg.%, it was necessary to feed milk containing at least 8 mg.% Mg. A Mg content lower than this occurred in milk from 3·7% of East Flemish red pied cattle. It was therefore possible that hypomagnesaemia existed, perhaps unrecognized in a small proportion of milk-fed calves. Symptoms and treatment of hypomagnesaemia were described.—R.M.

ADAMS, F. W. & HAAG, J. R. (1957). Copper contents of citrated whole blood and plasma of cattle.—*J. Nutr.* **63**, 585-590. [Authors' summary and conclusions slightly modified.]

1860

Data are presented on the copper content of 805 samples of citrated whole blood and plasma from cattle. The range in copper content covers variations in copper status extending from extreme deficiency states to more than normal intakes. Whole blood and plasma contain approximately equal concentrations of copper only in the vicinity of 1 µg./ml. Evaluation of copper status from blood analyses requires appropriate allowance for differences in the copper content of whole blood and of plasma.

NEENAN, M., WALSH, T. & O'MOORE, L. B. (1957). Some soil and herbage factors associated with the incidence and treatment of molybdenum conditional hypocuprosis on Irish pastures.—*Proc. VIIth Int. Grassl. Congr., Palmerston North*, 1956 pp. 345-355. Discussion: p. 356.

1861

In Ireland hypocuprosis in cattle is associated with excess molybdenum in the pasture. High levels of molybdenum are usually found in herbage growing on an alkaline soil, but two areas in Ireland are described where this occurs on an acid soil. Hypocuprosis was found in these areas and was prevented by the intravenous injection of copper. Experiments were carried out to investigate the effect of fertilizer application on these acid soils. A plot experiment

showed that the molybdenum content of the herbage varied between different species of grasses and clovers, and that copper sulphate and gypsum slightly decreased this content and phosphate increased it slightly. A pot experiment showed that increases in the amount of lime applied to soil resulted in increases in the molybdenum content of the herbage.

—E. J. CASTLE.

TAUXE, W. N., WAKIM, K. G. & BAGGENSTOSS, A. H. (1957). The renal lesions in experimental deficiency of potassium.—*Amer. J. clin. Path.* **28**, 221-232. [Interlingua summary.]

1862

In weanling rats on a diet deficient in potassium the weight gain in two weeks was about 10%, while it was over 100% in rats on a balanced diet, and the weight of the kidneys was greater. A characteristic lesion developed involving the entire nephron and consisting of dilatation of the tubules with necrosis of the parenchyma and vacuolation of the cytoplasm. Resolution of the lesion occurred when potassium was restored to the diet but calcium deposits within the lumen of the tubule and complete fibrosis persisted.—T.E.G.R.

FREINKEL, N. (1958). Pathways of thyroid phosphorus metabolism.—*Biochem. J.* **68**, 327-333. [Abst. from author's summary.]

1863

Sheep thyroid gland was examined by chromatographic techniques for the presence of phosphoglycerides and water-soluble intermediates of their metabolism. During incubation of sheep-thyroid slices, [³²P] orthophosphate was incorporated into all of the phosphorus-containing compounds. Specific radioactivities of the individual phospholipids varied greatly; phosphoinositide became more heavily labelled than any other phosphoglyceride. The incorporation of DL [¹⁴C] glycerol *in vitro* into all of the phosphoglycerides of sheep-thyroid tissue has been demonstrated, but the specific radioactivities were not as heterogeneous as the corresponding ³²P values. Certain conclusions were reached about the probable pathways of phosphoglyceride metabolism in sheep thyroid tissue.

ISLER, H., LEBLOND, C. P. & AXELRAD, A. A. (1958). Mechanism of the thyroid stimulation produced by sodium chloride in the mouse.—*Endocrinology* **62**, 159-172. [Abst. from authors' abst.]

1864

Prolonged ingestion of NaCl in mice increases the urinary loss of iodine and thus lowers the plasma concentration. As a result, less iodine is available to the thyroid gland and

less thyroid hormone is secreted. The pituitary gland responds by releasing more thyrotrophic hormone and thus stimulates the thyroid gland.

AL ZAHAWI, S. (1957). **Symmetrical cortical siderosis of the kidneys in goats.**—*Amer. J. vet. Res.* **18**, 861-867. [Author's summary modified.]

1865

The mountainous area of northern Iraq is rich in copper and iron but deficient in cobalt. It is reached only by goats. The unique features of spontaneous bilateral siderosis in the renal cortex of goats from this region were described. Iron deposition was rare or absent in organs other than the kidneys. Various organs, particularly the testes, had a high Cu content, which might explain the high incidence of testicular atrophy. The deposition of ferric compounds in the proximal convoluted tubules did not, of itself, cause clinical manifestations, dysfunction, or important histological changes, except for thickening of the basement membrane. The findings in the urine, faeces, blood, and serum of goats with normal and with pigmented kidneys were recorded. Goats fed low doses of inorganic Fe and Cu showed no functional or anatomical disorder; those fed high doses, with protein deficient diets, developed generalized siderosis of the viscera, particularly the kidneys, with parenchymatous changes in various organs. Neither group developed the lesions of the field condition. Some other factor, possibly cobalt deficiency, might be involved.

GREENBERG, S. M., TUCKER, R. G., HEMING, A. E. & MATHUES, J. K. (1957). **Iron absorption and metabolism. I. Interrelationship of ascorbic acid and vitamin E.**—*J. Nutr.* **63**, 19-31.

1866

TUCKER, R. G., GREENBERG, S. M., HEMING, A. E. & MATHUES, J. K. (1957). **Iron absorption and metabolism. II. Substitution of N,N'-diphenyl-*p*-phenylenediamine (DPPD) for vitamin E.**—*Ibid.* 33-40. [Authors' summaries modified.]

1867

I. The effects of supplements of iron with ascorbic acid and vitamin E on haemoglobin regeneration were studied in milk-fed anaemic rats. The rate of haemoglobin regeneration was consistently greater in rats supplemented with iron plus ascorbic acid and vitamin E than with iron alone or with iron plus either of the vitamins. In a long-term study haemoglobin levels were better sustained after the cessation of iron supplements if the iron had been given with both ascorbic acid and vitamin E than if given alone or with either vitamin separately.

II. The effect of substituting an antioxidant [*N,N'*-diphenyl-*p*-phenylenediamine (DPPD)]

for vitamin E was tested in haemoglobin regeneration studies on milk-fed anaemic rats. The average levels of haemoglobin regeneration and the average haematocrits were higher in the rats supplemented with iron plus ascorbic acid and the antioxidant than in those receiving iron alone or iron plus either ascorbic acid or DPPD.

MCGILLIVRAY, W. A. & THOMPSON, S. Y. (1957). **The influence of pasture on the vitamin A and carotene in the milk of cows.**—*Proc. Nutr. Soc.* **16**, 30-36.

1868

An account is given of the effect of breed, stage of lactation, food and hormonal influences on the vitamin A and carotene content of cow's milk. The variations in the vitamin A content of milk from cows on pasture, especially in New Zealand where the potency is lower in summer than in winter, are also discussed. Some metabolic disturbances associated with pasture feeding in New Zealand are listed: facial eczema is one of the most important of these.

—E. J. CASTLE.

CORDY, D. R. (1957). **Osteodystrophia fibrosa accompanied by visceral accumulation of lead.**—*Cornell Vet.* **47**, 480-490. [Author's summary modified.]

1869

Osteodystrophia fibrosa in 3 growing baboons was described and differentiated from other bone diseases. An abnormal calcium/phosphorus ratio in the diet, similar to that observed in horses with the condition, was found. Low renal levels of lead with accompanying inclusion bodies were an incidental finding.

GOODWIN, R. F. W. & JENNINGS, A. R. (1958). **Mortality of new-born pigs associated with a maternal deficiency of vitamin A.**—*J. comp. Path.* **68**, 82-95. [Authors' conclusions slightly modified.]

1870

Four herds were described in which many piglets died shortly after birth or, if viable, were born blind. At least 21 litters suffered heavy mortality and a further 11 or more litters contained piglets with a variety of eye defects. It was concluded that a maternal deficiency of vitamin A was the common cause. In three herds with reliable histories the diet of the affected dams was grossly deficient in vitamin A and in two herds where the analyses were made there was little or no vitamin A in the piglets' livers at birth. In one herd, dosing two pregnant sows with vitamin A palmitate prevented the condition, while two sows left untreated continued to lose their litters. The dams of affected litters appeared normal and, apart from blindness, the clinical signs in the piglets were not striking. Litters that were moribund at birth were born

at full term but showed extreme weakness. Viable piglets showed eye defects, but externally there were no other deformities. Internally, there were gross abnormalities of the kidney and lung, and one of the most striking features was the generalized oedema. Histologically, there was proliferation and vacuolation, but no metaplasia of epithelial surfaces. The eyes showed a great variety of changes ranging from complete disorganization to near normality.

LANDAU, L. & MARCINKA, K. (1957). Pôsobenie vitamínu E na účinnosť a využitie vitamínu A v priebehu reprodukcie hrabavej hydiny. [Effect of vitamin E on vitamin A utilization and reproduction in fowls.]—*Vet. Cas.* **6**, 265-278. [In Slovak. English, French, German and Russian summaries.] **1871**

Two groups each of 50 laying hens of an average body wt. of 4 lb. and an average annual egg yield of 153 were used in this experiment. During October-November, both groups were put on a diet containing approx. 300 µg. of β-carotene and traces of vitamin A. Later both groups received supplements of 3000 i.u. of vitamin A and group II an additional supplement of 1 mg. of vitamin E. It appeared that vitamin E supplements affected neither the number, the fertility, nor the vitamin A content of eggs laid. Mortality of chicks hatched from eggs laid by Group I was 6·2%, of those of group II 10·8%. Vitamin A content of 1 g. of liver from offspring of group I was 48·2 i.u., and from those of group II 22·3 i.u. This was taken to justify the assumption that vitamin A metabolism in chick embryos was increased by vitamin E supplements to the hens. The small amount of vitamin A stored in the liver of offspring of hens from group II was regarded as the cause of the comparatively high mortality rate during the first few days of life. 100 g. of liver from hens of group I contained 81,240 i.u. and from hens of group II 145,240 i.u. of vitamin A. The effect in the laying fowl of vitamin E supplements on vitamin A metabolism was evident from higher rate of storage and better utilization of food.

—E.G.

BLACKBURN, P. S., BLAXTER, K. L. & CASTLE, E. J. (1957). Vitamin D₃ toxicity in calves.—*Proc. Nutr. Soc.* **16**, No. 2, p. xvi. of Proceedings. **1872**

Twenty-four calves were given 1.0×10^6 i.u. vitamin D₃ daily, or supplements of CaCO₃ or CaHPO₄, or the vitamin with one or the other mineral supplement, or were maintained without supplements, as controls. Signs of toxicity were observed in calves receiving vitamin D₃ with or without minerals, those receiving the vitamin

plus CaCO₃ having the shortest life span. Minerals alone had no adverse effect. A description is given of the symptoms of vitamin D₃ toxicity and of the P.M. and histological findings. Serum Ca and Mg and whole blood inorganic P were determined throughout the experiment and the Ca, Mg and P content of various tissues determined P.M.

DINNING, J. S. & DAY, P. L. (1957). Vitamin E deficiency in the monkey. II. Tissue concentrations of nucleic acids and creatine.—*J. Nutr.* **63**, 393-397. [Authors' summary copied verbatim.] **1873**

The concentrations of tissue nucleic acids and muscle creatine were determined on vitamin E-deficient, normal, and recovered monkeys. Vitamin E deficiency resulted in an elevated concentration of skeletal muscle desoxyribonucleic acid (DNA) and an elevated concentration of bone marrow DNA and ribonucleic acid (RNA). The bone marrow RNA/DNA ratio was elevated in vitamin E-deficient monkeys. All these changes were reversed with tocopherol therapy. Skeletal muscle creatine was reduced in vitamin E-deficient monkeys and only partially restored toward normal in recovered animals.

ARUNDEL, J. H. (1958). Perosis and folic acid antagonism in chickens.—*Nature, Lond.* **181**, 342. **1874**

Pyrimethamine fed to chicks from seven days of age at concentrations of 25, 50 and 100 p.p.m. induced toxicity, as shown by a reduction in rate of growth, by perosis and deaths.

—S. BRIAN KENDALL.

GRABOWSKI, K., RYDEL, S. & SZEWZYK, J. (1957). Niedobór pierwiastków śladowych oraz hipowitaminoza B₁₂ u bydła i owiec na glebach torfowych doliny nadnoteckiej. [Deficiency in trace elements and vitamin B₁₂ in cattle and sheep reared on marsh land.]—*Méd. vét., Varsovie* **13**, 669-674. [In Polish. English and Russian summaries.] **1875**

The authors investigated a condition in sheep and cows, reared on marshy land, which was characterized by dullness, anaemia, stunted growth and reduced milk yield. In one village where 500 sheep and 100 cows were observed for 3 years, the condition was noted only in sheep and only during one year when the level of cobalt in hay ranged from 0·05 to 0·11 and that of copper from 7·5-9·0 µg./g. on a dry matter basis. In the next two years, when the levels of cobalt and copper were within the normal range, no clin. symptoms were seen. In another village the clin. symptoms were noted in cows and sheep every year, and while the level of copper in the

hay varied from 1.33 to 6.42 µg./g. that of cobalt was normal (0.12 to 0.26 µg./g.). The serum copper in the affected cows was slightly depressed and serum vitamin B₁₂ markedly lowered. The cobalt and folic acid levels were normal. Animals in both villages responded well to supplements of Cu and Co, and their vitamin B₁₂ levels were higher than in controls. Parenteral administration of vitamin B₁₂ to anaemic sheep raised their levels of blood Co and haemoglobin. The authors concluded that in addition to cobalt, copper also plays an important role in the synthesis of vitamin B₁₂.—M. GITTER.

VAN MIDDLESWORTH, L. (1957). **Thyroxine excretion, a possible cause of goiter.**—*Endocrinology* **61**, 570-573. [Author's summary modified.]

1876

Rats were injected i/p with 1-2 µg. of thyroxine marked with I¹³¹. The rate at which the thyroxine was excreted was 2 to 20 times greater in rats fed on soya flour or laboratory chow than in controls.

HAZELWOOD, R. L. & LORENZ, F. W. (1957). **Responses of the domestic fowl to hyper- and hypoglycemic agents.**—*Endocrinology* **61**, 520-527. [Abst. from authors' summary.]

1877

I/v injection of cobaltous chloride in chicks 6-7 weeks old caused a moderate hyperglycaemia lasting at least 5 hours; nickel and iron

See also absts. 1969-1971 (sex hormones); 1980-1983 (reports, Australia).

DISEASES, GENERAL

STEWART, A. & O'CONNOR, L. K. (1957). **Wastage and culling in private milk records herds, 1955-6.**—*Vet. Rec.* **69**, 1021-1025. [Abst. from authors' summary.]

1879

During the survey period culling and wastage in 11,000 herds comprising 200,000 cows was estimated from data collected by fieldsmen during one week in each month. True wastage amounted to 23.9% as follows: death, 1%; old age 1.8%; infertility, 3.2%; disease and accident, 4.5%; low productivity, 5.8%; miscellaneous (sales for slaughter), 7.8%. Sales for dairying were 5.3%; the total culling and wastage was 29.2%. Culling was heaviest among third calvers. True wastage among heifers was 7.9% as follows:—death, 0.3%; infertility, 3.8%; disease and accident, 1.1%; sales for slaughter, 2.7%. In addition 6.9% were sold for dairying, bringing the total wastage and culling to 14.8%.

STOL'NIKOV, V. I. (1957). **[Listerella infection and malignant catarrhal fever in cattle.]**—

salts had no effect. I/m injection of glucagon produced a transitory hyperglycaemia in 12-week-old birds comparable with that reported in mammals, but in 6-week-old birds the increase in blood sugar lasted for at least 5 hours. As little as 10 mg./kg. of body wt. of "Orinase" [1-butyl-3-p-tolsulphonylurea] injected i/m decreased the blood sugar content, the most effective dose being 200 mg./kg. Six-week-old birds were more resistant to "Orinase" than 12-week-old birds receiving the same dosage. The inability of the young bird to compensate for artificially induced hyperglycaemia and its resistance to "Orinase" suggest that its islet beta cells are hypofunctional.

PATERSON, R. A. (1957). **Prednisolone in the treatment of bovine ketosis.**—*Vet. Rec.* **69**, 1097-1100. [Author's summary slightly modified.]

1878

Prednisolone (Deltacortril) is effective treatment for primary bovine ketosis in a very high percentage of cases. The satisfactory dosage level (about 100 mg.) is smaller than that recorded for other glucocorticoids. A small percentage of cases relapsed following initial prednisolone therapy, and the occurrence of side effects attributable to the steroid was negligible. The preparation of prednisolone employed was characterised by rapid physiological effect and ease of administration.

Veterinariya, Moscow **34**, No. 7. pp. 34-38. [In Russian.]

1880

In a previous paper [*V.B.* **26**, 1375] S. emphasized the difficulty of differential diagnosis of these two diseases. He now reports bacteriological and serological investigations of outbreaks where both diseases occurred singly in some cattle and as mixed infections in others.—R.M.

SERÝ, V. & STRAUSS, J. (1957). Výskyt ornithosy a salmonellosy u racka chechtavého (*Larus ridibundus* L.) I. epidemiologická vyšetřování. [The incidence of ornithosis and salmonellosis in the black-headed gull. (*Larus ridibundus* L.) I. Epidemiological investigations.]—*Ceskosl. Epidemiol., Mikrobiol., Imunol.* **6**, 152-156. [In Czech. Russian and English summaries.]

1881

Salmonella typhi-murium was isolated from spleen, liver and faeces of 31, and psittacosis virus from liver and spleen, of two black-headed gulls found dead or dying in the vicinity of a

duck farm in Czechoslovakia where there had been outbreaks of salmonellosis and psittacosis among ducks and farm personnel.—E.G.

SUKHOMLINOV, B. F. (1958). [Distribution of radioactive phosphorus in organs and tissues of healthy cows and in a cow with haematuria.]—*Proc. Lenin Acad. agric. Sci.* 23, No. 2, pp. 41-42. [In Russian.] 1882

Sodium phosphate labelled with ^{32}P was injected s/c at a dosage of 1·8-2·7 microcuries per kg. body wt. to 5 normal cows and a cow with chronic haematuria. They were killed after 2 hours and the radioactivity of organs and body fluids was determined (results tabulated). In general, the radioactivity of material from the cow with haematuria was lower than that from normal cows.—R.M.

LEWIS, E. F. & PRICE, E. K. (1957). The use of choline chloride as a lipotropic agent in the treatment of bovine liver dysfunction.—*Brit. vet. J.* 113, 242-246. 1883

Ten cows with post-parturient fatty infiltration of the liver were given 25 g. of choline chloride followed by a further 25 g. from two to four hours later. Administration was by subcutaneous injection of an aqueous solution followed by massage to the injection site, or, as an aqueous solution given by a nasal tube. Treatment was successful in all except one case. The relevant literature in relation to experimental work on laboratory animals is included in a discussion of the results.—D. S. PAPWORTH.

CHIVERS, W. H. (1957). An investigation of bovine interdigital overgrowth.—*Vet. Med.* 52, 579-580. 1884

Interdigital exostosis was observed in X-rays of 29 of 36 feet of cattle with interdigital overgrowths, whilst 32 had some bony lesion. Interdigital exostosis was also observed in one of 16 feet of similar type cattle adjudged clinically normal and two had some bony lesion. Too much spreading of the digits on weight bearing results in excess strain on the interdigital ligaments and causes them to pull on the phalangeal periosteum, producing chronic periostitis followed by exostosis. Tissue formed in the increased interdigital space is then repeatedly forced downwards with walking. Interdigital overgrowths appear to be caused by hereditary and nutritional factors.—A. ACKROYD.

TIMONEY, J. F. (1957). Oedema disease in swine.—*Vet. Rec.* 69, No. 49, Pt. 2, pp. 1160-1171. Discussion: pp. 1171-1175. 1885

T. discussed recent work on oedema disease. It could be reproduced by i/v inoculation of supernatant fluid from centrifuged bowel con-

tents of affected pigs, but not after the fluid was heated at or above 65°C. for 15 min. Bowel fluid from normal pigs did not cause oedema disease when inoculated i/v, although it did contain a non-specific toxic factor. Serum from pigs hyperimmunized with bowel fluid from pigs with oedema disease neutralized the causal agent of the disease, and also neutralized extracts of haemolytic *E. coli* isolated from the intestine of a pig with the disease.—R.M.

CASAROSA, L. (1957). Lesioni capsulari spleniche in cane analogabili alle c.d. aree di Gandy-Gamma dell'uomo. [A condition in dogs characterized by spleen lesions similar to Gandy-Gamma nodules of man.]—*Acta med. vet., Napoli* 3, 17-34. [English and French summaries.] 1886

Yellowish-grey nodules (1-1·5 mm. in diam.) were encountered in the inferior portion of the spleen capsule of dogs of all ages and of either sex. Histologically the lesions were similar to the Gandy-Gamma nodules seen in man. Their pathogenesis is not clear but according to hypotheses postulated by other workers, the condition may be due to small, repeated haemorrhages associated or not with stasis. There is no apparent association with disease; in fact the nodules were observed in clinically normal dogs as well as in dogs with various diseases.

—T.E.G.R.

CLARK, C. H. & WALLACE, C. R. (1957). Canine electrocardiography.—*Auburn Vet.* 14, 17-54. 1887

A detailed account of the technique of electrocardiography in the dog and the interpretation of the results, with notes on the diagnosis and treatment of heart diseases.—R.M.

TENNILLE, N. B. & THORNTON, G. W. (1958). Intravenous urography studies in the unanesthetized dog.—*Vet. Med.* 53, 29-40. 1888

The authors described a technique for making radiographs of the urinary system after i/v inj. of contrast medium. Compression of the ureters by means of a special belt placed around the abdomen improved the pictures of the kidneys. Anaesthesia was unnecessary.—R.M.

SAUNDERS, C. N. (1958). Kerato-conjunctivitis in broiler birds.—*Vet. Rec.* 70, 117-119. [Author's summary copied verbatim.] 1889

An outbreak of kerato-conjunctivitis in broilers is described. A small-scale experiment successfully reproduced the disease with ammonia but failed to show any transmissible infective agent. It is concluded that exposure to ammonia arising from the litter is directly concerned with its causation.

UGLIALORO, A. & ALDER, H. L. (1957). The correlation between packed cell volume and erythrocyte number in canine blood.—*Amer. J. vet. Res.* **18**, 909-911. [Authors' summary modified.] **1890**

A statistical evaluation of 562 packed cell volume (PCV) readings of canine blood and corresponding erythrocyte counts is presented. The correlation between PCV and mean erythrocyte number was better than would appear from a superficial observation. The mean erythrocyte number could, therefore, be determined to a high degree of accuracy from a single reading of the PCV. The statistical procedures are described and a table shows the values obtained.

MILNE, F. J. (1957). Observations on radio-dermatitis in horses.—*J. Amer. vet. med. Ass.* **131**, 75-80. **1891**

Irradiation experiments were carried out on a three-year-old chestnut gelding and a five-year-old chestnut mare to determine the maximum amount of radiation therapy that could be tolerated for a single treatment. The number of roentgens as "free-in-air" figures delivered to selected sites of shaved and unshaved skin varied between 500 and 5,000. Results showed that 500 r is the maximum to be given at one time on shaved skin. A dose of 1000 r will give rise to depigmentation on unshaved skin lasting for several months, if not permanently.

—D. S. PAPWORTH.

WOLFF, A. H. (1957). Radioactivity in animal thyroid glands.—*Publ. Hlth Rep., Wash.* **72**, 1121-1126. [Author's summary modified.] **1892**

Iodine-131 activity was readily found in thyroid glands from animals in Arizona, Pennsylvania, Ohio, and Oregon within 2 weeks after the start of the 1956 United States Pacific atomic weapons test. A progressive increase was noted in the proportion of samples which were active from mid-May to mid-October, at which time the study was terminated. Based on the Arizona and Ohio data, between mid-May and mid-October the average weekly intake for cattle was 35 and for sheep 120 millirep, apparently harmless to their health. It is suggested that the average cattle I^{131} level found in this study approximates the average continuously existing in cattle in the U.S.A. during the past two or three years. Theoretical considerations indicate that with the levels of I^{131} found in cattle thyroids the milk would have contained detectable amounts of I^{131} .

I. STORER, J. B. & SANDERS, P. C. (1958). Relative effectiveness of neutrons for produc-

tion of delayed biological effects. I. Effect of single doses of thermal neutrons on life span of mice.—*Radiation Res.* **8**, 64-70. **1893**

II. STORER, J. B., ROGERS, B. S., BOONE, I. U. & HARRIS, P. S. (1958). Relative effectiveness of neutrons for production of delayed biological effects. II. Effect of single doses of neutrons from an atomic weapon on life span of mice.—*Ibid.* 71-76. [Authors' summaries modified.] **1894**

I. White Swiss mice were exposed to single, graded doses of X-rays or thermal column radiation (thermal neutrons plus gamma rays). Life span was shortened by about 5% per 100 rads for either type of radiation. The relative biological effectiveness of thermal column radiation for shortening life was 1.00 ± 0.24 , not significantly different from that which produced death in 30 days.

II. Mice were exposed to neutrons or to mixtures of neutrons and γ -rays from an atomic explosion. Neutrons shortened the mean life span by 6.7% per 100 rads, and γ -rays shortened it by 2.6% per 100 rads. The relative effectiveness of neutrons for producing this delayed response was 2.6, a value in close agreement with those previously obtained for producing acute effects.

MOLE, R. H. (1957). Shortening of life by chronic irradiation: The experimental facts.—*Nature, Lond.* **180**, 456-460. **1895**

M. reviewed some experimental results on the shortening of the life-span of animals exposed under varying conditions to radiation by gamma rays or fast neutrons. Methods of assessing results and their interpretation were discussed, and consideration given to how results of chronic toxicity experiments might be generalized.

—D. S. PAPWORTH.

LANGHAM, W. H. & ANDERSON, E. C. (1957). Strontium-90 and skeletal formation.—*Science* **126**, 205-206. **1896**

From a knowledge of the amount of bone remodelling plus exchange and the rates of skeletal growth and strontium-90 increase in the biosphere, it is possible to compute the fraction of equilibrium strontium levels to be expected in the skeletons of growing children as a result of direct incorporation during a period of environmental contamination. The authors, by assembling various published data, show that using this knowledge and adding the contribution of bone remodelling and exchange to the contribution of new bone growth gives a total skeletal burden in terms of equilibrium level.

—D. S. PAPWORTH.

POISONS AND POISONING

GIBSON, E. A. (1957). An outbreak of sodium chloride poisoning in turkey poult. — *Vet. Rec.* **69**, 1115-1117. [Author's summary modified.]

1897

In two batches of young turkey poult a mortality of 11% and 5% occurred following the use of a turkey starter meal containing 2% of sodium chloride. The symptoms, P.M. findings and histopathology are described.

OLOMUCKI, E. (1957). Action of ethylene dibromide on hen gonadotrophic hormones. — *Nature, Lond.* **180**, 1358-1359.

1898

Ethylene dibromide (dibromoethane) was found to remain in small amounts in fumigated grain up to six weeks after fumigation. This had a harmful effect on laying hens, and diminution in size of egg, followed by cessation of laying were observed. Observations led to the hypothesis that the action of small amounts of ethylene dibromide was very specific on pituitary gonadotrophic hormones and should be distinguished from the general poisonous action of large doses. The observation that ethylene dibromide did not affect follicle-stimulating hormone *in vitro* supported the assumption that ethylene dibromide did not act on follicle-stimulating hormone directly, but attacked rather the formation or release of the hormone from the pituitary.

—R.M.

PAPWORTH, D. S. (1958). A review of the dangers of warfarin poisoning to animals other than rodents.—*Roy. Soc. Hlth J.* **78**, 52-60.

1899

Although there is little danger of animals accidentally ingesting a single toxic dose of warfarin, the possibility of cumulative poisoning by repeated small doses must not be disregarded. P. discussed reported cases of poisoning in cattle, pigs, dogs, cats and poultry.—R.M.

COX, D. H. (1957). Isolation and identification of strychnine and other alkaloids in veterinary toxicology.—*Amer. J. vet. Res.* **18**, 929-931. [Author's summary modified.]

1900

A simple and rapid procedure is described for isolating alkaloids from animal tissues and identifying them by paper chromatography, spot-tests, and absorption of ultra-violet light.

SELYE, H. (1957). Lathyrism.—*Rev. canad. Biol.* **16**, 1-82. [In English, French summary.]

1901

The object of this monograph is to present the accumulation of scattered observations deal-

ing with clinical and experimental lathyrism, which may appear quite unrelated but may be essential for rational analysis. In man lathyrism (spastic paralysis) is a nervous disease (neuro-lathyrism) unaccompanied by any significant changes in the skeletal system and is caused by the ingestion of certain plant products, particularly *Lathyrus sativus*. Osteolathyrism, an apparently unrelated skeletal disease with secondary changes in the nervous system can be induced experimentally in lab. animals by feeding seeds of other types of *Lathyrus* plants, the active principles of which are aminonitriles. Certain synthetic aminonitriles which do not occur naturally in food, also have osteolathyrogenic properties, while other related nitriles produce predominantly nervous manifestations, and a few cognate compounds induce typical skeletal changes in combination with some nervous derangements. These neurological disturbances, however, are characterized by excitement with choreiform and circling movements (ECC-syndrome), quite unlike the neurolathyrism that occurs in man, together with severe ocular lesions (cloudiness of the cornea, conjunctivitis and retinal detachment). S. enumerated certain basic problems to stimulate further research. Some of the histopathological changes produced by the aminonitriles closely resemble certain afflictions of man. The observations that these experimental lesions can be produced by external agents may help in furthering our knowledge of the factors involved in experimental lathyrism and thus aid in the elucidation of the pathogenesis and in devising further procedures for the treatment of the corresponding conditions in man.

—R. V. L. WALKER.

SIMON, J., SUND, J. M., WRIGHT, M. J., WINTER, A. & DOUGLAS, F. D. (1958). Pathological changes associated with the lowland abortion syndrome in Wisconsin.—*J. Amer. vet. med. Ass.* **132**, 164-169. [Authors' summary modified.]

1902

Non-specific abortion has been observed for 50 years in cattle grazing weed-infested lowland pastures in Wisconsin. In a field trial 10 out of 12 heifers aborted on such pasture, but only one of 8 aborted on pasture treated with herbicide. The characteristic pathological changes include perirenal haemorrhage and kidney degeneration in the foetus, numerous circumscribed, calcified, necrotic lesions in the intercotyledonary areas of the foetal membrane, and pleural thickening and vascular changes of the

lungs of the dam and foetus. It was suggested that plants with a high concentration of nitrates, or nitrites, were responsible for abortion.

SIMPSON, J. E. V., SINCLAIR, D. P., SWAN, J. B. & FILMER, J. F. (1957). Photosensitivity diseases in New Zealand. XI. Collection and preservation of pasture that produces facial eczema.—*N.Z. J. Sci. Tech. Sect. A*, **38**, 947-955. [Authors' summary modified.] 1903

It has been demonstrated that liver damage characteristic of facial eczema can be produced in penned lambs and guinea-pigs by feeding them green herbage from a pasture that has produced liver damage in grazing lambs. The toxicity of this herbage can be preserved to some extent by drying in air having a temperature between 95° and 110°C. when it enters the herbage. A method has been devised for determining toxic periods by systematic liver examination of lambs introduced into experimental paddocks at short intervals. The method of collecting, drying, and storing herbage from toxic pasture for chemical determination of the liver-damaging substance is described.

BULL, H. McM. (1957). Crops for facial eczema control.—*N. Z. J. Agric.* **95**, 341-345. [Author's summary modified.] 1904

Ensuring that stock do not graze toxic pastures is at present the only method of preventing facial eczema. This may mean that heavy concentrations of animals have to be held on bare paddocks, which is obviously undesirable at times when lambs should be fattened, ewes "flushed" before mating, or dairy herd production maintained. The only alternative is to have available in summer and autumn fodder crops which have been proved to be safe. Crops suitable for use under conditions when facial eczema precautions become necessary are described.

I PERRIN, D. D. (1958). The determination of phylloerythrin in blood.—*Biochem. J.* **68**, 314-318. 1905

II. PERRIN, D. D. (1958). The form in which phylloerythrin occurs in bile and blood.—*Ibid.* 318-319. 1906

I. Phylloerythrin, a normal component of the bile and faeces of herbivores, is formed by microbial degeneration of chlorophyll and related pigments in their passage through the gut, from which it is partially absorbed and re-excreted in the bile. In certain types of liver dysfunction it accumulates in the peripheral circulation, causing intense photosensitization. P. devised a spectrophotometric method for determining amounts of phylloerythrin ranging

from 0.05 to 3.5 mg. per 100 ml. of plasma.

II. Although phylloerythrin is extremely insoluble in water, it occurs as a normal constituent of sheep and ox bile. P. suggested that it was dispersed on colloidal substances such as bile salts and plasma proteins. In support of this hypothesis was the observation that in sheep affected with geldikkop [tribulosis] phylloerythrin was present entirely in the plasma, only traces being found in the well-washed corpuscles.

—R.M.

BARNETT, B. D., RICHEY, D. J. & MORGAN, C. L. (1957). Hemorrhage in chicks induced by beta-aminopropionitrile and sulphaquinoxaline.—*Poult. Sci.* **36**, 1104. 1907

Beta-aminopropionitrile in the diet at concentrations of 0.05, 0.06 and 0.09% produced lesions in chickens, including subcutaneous, intramuscular and internal haemorrhages. Haemorrhages were increased by the addition of sulphaquinoxaline and in general were reduced by the addition of vitamin K. Reduction of vitamin K or increase in the fat content of the diet increased the incidence of internal haemorrhages induced by β -aminopropionitrile.

—S. BRIAN KENDALL.

ACKERMAN, C. J. (1957). Reversal of sulphaquinoxaline toxicity in the rat.—*J. Nutr.* **63**, 131-142. [Abst. from author's summary.] 1908

Growth was inhibited when weanling rats were fed complete diets containing 1% sulphaguanidine. When meat meal (5%) was incorporated into the sulphaguanidine-containing diet of weanling rats, growth was as good as, or better than, in controls whose diets contained neither sulphaguanidine nor meat meal. The growth-promoting factor of meat meal was stable to dry heat and to refluxing with 6N HCl for 24 hours, but was destroyed or inactivated by refluxing with NH_4OH or NaOH. Activity of meat meal was retained in the acid-insoluble residue after refluxing with 5N HCl for 13 hours. Comparison of the stability of meat meal with thyroid powder indicated that the active principle in meat meal was not thyroxine.

DOW, C. (1958). The pathology of stilboestrol poisoning in the domestic cat.—*J. Path. Bact.* **75**, 151-161. [Author's summary modified.] 1909

Stilboestrol dipropionate in doses from 1 to 10 mg. per day proved fatal in the adult cat; survival time was inversely proportional to the dosage. The liver, myocardium and pancreas always contained lesions which varied in type with the survival time and the dosage. After

prolonged administration, changes were noted in the adrenals, thyroids and salivary glands. Evidence of liver damage was obtained from liver-function tests.

WILLIAMS, M. W., FITZHUGH, O. G. & COOK, J. W. (1957). Serum protein changes following feeding of parathion to dogs.—*Proc. Soc. exp. Biol., N.Y.* **96**, 539-540. [Authors' summary modified.] **1910**

Serum electrophoretic patterns of 4 dogs fed 100 p.p.m. of organic phosphate parathion for 9 weeks revealed a decrease in albumin content and an increase in beta globulin content. The significance of these findings is discussed.

NECHINENNUI, D. K. & LI, P. N. (1957). [Toxicity of chlorten aerosol for animals.]—*Veterinariya, Moscow* **34**, No. 9, pp. 82-83. [In Russian.] **1911**

Chlorten [see V.B. 27, 2728] was used as a 5% soln. in solar oil at a rate of 15-30 ml. per cu. metre and for an exposure time of 15 min. to destroy flies and ticks in sealed farm buildings. Exposure of sheep, an ox, g.pigs and rabbits to these concentrations of chlorten

See also absts. 1807 (CCl₄); 1823 (copper methylarsenate); 1872 (vitamin D, in calves); 1911 (chlorten aerosol); 1980-1984 (reports, Australia).

PHARMACOLOGY AND GENERAL THERAPEUTICS

(For treatment of specific infections see under the appropriate disease.)

ULLBERG, S., HANSSON, E. & FUNKE, H. (1958). Distribution of aqueous penicillin and penicillin in oil in normal goat udders following intramammary injection—an autoradiographic study.—*Amer. J. vet. Res.* **19**, 135-138. [Authors' summary modified.] **1913**

Penicillin, labelled with radioactive sulphur and prepared both as an aqueous solution and as a suspension in oil, was introduced through the teat canal into normal goat udders. The distribution of the penicillin, one and eight hours after injection, was studied by autoradiographic methods. A fairly uniform distribution was obtained with both aqueous and oily penicillin. Penicillin in oil was concentrated more than aqueous penicillin in the dorsal portions of the udders and more was found in the milk ducts than in the parenchyma.

PRESKOTT, B., KAUFFMANN, G. & JAMES, W. D. (1958). Means of increasing the tolerated dose of streptomycin in mice.—*Antibiot. & Chemother.* **8**, 26-32. [Spanish summary p. 55. Authors' summary modified.] **1914**

Streptomycin was lethal for 50% of mice in a dose of 7.5 mg. (375 mg./kg.) and lethal for

aerosol for 15 min. caused severe but not fatal poisoning in all cases, associated with rapid increase in blood catalase. Ticks feeding on the animals were not all killed by exposure to chlorten aerosol for 15-30 min.—R.M.

BIERER, B. W. (1958). The ill effects of excessive formaldehyde fumigation on turkey pouls.—*J. Amer. vet. med. Ass.* **132**, 174-176. [Author's summary modified.] **1912**

Newly hatched turkey pouls were exposed to formaldehyde fumigation as normally used, and at 2, 4, and 6 times the normal concentration. No gross air sac lesions were induced. Fumigation with twice the usual concentration killed 25%. Excessive fumigation caused conjunctivitis and gasping. Severely affected birds became prostrate and died. Gross pathological changes included exudative inflammation of the conjunctival sacs and mucous membranes of the oral and pharyngeal cavities. Death from suffocation, due to occlusion of the pharyngo-laryngeal orifice, occurred within 40 hours. Subcutaneous oedema was observed in the pouls that died, but in none of the survivors killed 5 or 10 days after fumigation.

92% in a dose of 10 mg. (500 mg./kg) by s/c administration. By the use of various adjuvants, mice could be protected against two or even three times the lethal dose. Glycine and/or sodium glucuronate permitted tolerance of 20 mg. streptomycin, and optimal results were obtained when both were used. Sodium salts of two alpha-keto acids, alpha-ketoglutaric and pyruvic acid, increased the tolerated dose to 20 and 30 mg. with 85% and 64% survival, respectively. Aqueous glycerol (35%) or aqueous propylene glycol (75%) solutions enabled most of the animals to survive 15 and 20 mg. of streptomycin, respectively.

BUISTROV, B. N. (1957). [Suboccipital procaine anaesthesia, combined with chloral hydrate administered intravenously.]—*Veterinariya, Moscow* **34**, No. 6, pp. 48-51. [In Russian.] **1915**

General anaesthesia was induced by the suboccipital injection of 3% procaine soln., of which the usual dose was 1.5-2 ml./100 kg. body wt. (maximum dose 2.5 ml./100 kg.). This method of anaesthesia had the advantage of stimulating the cardiovascular system, respiratory organs,

and gastro-intestinal tract, and was therefore suitable for animals liable to develop shock. The main disadvantage was that it caused a severe fall in blood pressure. This was minimized by simultaneous i/v inj. of chloral hydrate, 50 ml. of 10% soln./100 kg. The combined method was used successfully to anaesthetize over 100 horses.—R.M.

See also absts. 1682 (terramycin in "shipping fever"); 1683 (antibiotics in *Past. septica* infection); 1713, 1714 (antibiotics in leptospirosis); 1736 (merthiolate in contagious agalactia); 1743 (chemotherapy of trichomoniasis); 1749, 1751 (nicarbazin in coccidioidosis); 1750 (menaphthone in coccidioidosis); 1759 (sulphones in toxoplasmosis); 1760 (chemotherapy of babesiosis and anaplasmosis); 1774 (action of sodium desoxycholate on arthropod-borne viruses); 1791 (chlortetracycline in psittacosis); 1792 (antiviral action of porphyrins); 1798 (piperazine-carbon disulphide as parasiticide); 1799 (phenothiazine stilboestrol); 1800-1802 (ET-57); 1801 (fly repellents); 1803 (BHC-creolin in sheep scab); 1807 (CCl₄ in fascioliasis); 1810, 1813, 1815, 1820, 1822, 1824, 1826 (anthelmintics); 1838 (chlortetracycline in g.pig nutrition); 1839 (antibiotics); 1840 ("DPPD"); 1866 (ascorbic acid and vitamin E); 1867 (DPPD); 1878 (prednisolone in ketosis); 1883 (choline chloride in liver dysfunction); 1907 (toxicity of beta-aminopropionitrile and sulphaguinoxaline); 1908 (toxicity of sulphaguanidine); 1909 (toxicity of stilboestrol); 1910 (parathion); 1911 (toxicity of chlorten); 1912 (formaldehyde); 1955 (progesterone); 1956 (oestrogen therapy in cystic glandular hyperplasia of endometrium); 1960 (therapeutic serum); 1961 (vitamin E therapy in sterility); 1969-1971 (sex hormones); 1980-1983 (reports, Australia); 1985 (report, Kenya).

PHYSIOLOGY, ANATOMY AND BIOCHEMISTRY

ALIM, K. A. & AHMED, I. A. (1957). Studies on the body temperature and respiration rate of buffalo cows under normal conditions.—*Canad. J. Anim. Sci.* 37, 130-135. 1917

A report on a study over a period of 24 days of the body temperature and respiration rate of ten normal buffalo cows (4 in early lactation, 2 in late stages of pregnancy and 4 open dry cows), housed in open sheds during the summer in Egypt. A wide variation between animals in body reactions was noted. The diurnal variations in body reactions coincided with similar variations in atmospheric conditions, but vapour pressure was more closely correlated with physiological responses than was air temperature. Measurements of body temperatures, when the cows were under stress, were better for assessing heat tolerance than were the respiration rates.—R. V. L. WALKER.

KAYSER, C. (1957). Le sommeil hivernal, problème de thermorégulation. [Hibernation and heat regulation.]—*Rev. canad. Biol.* 16, 303-389. 1918

This monograph is the result of a review of many references and of studies on hibernation and heat regulation conducted at the Institute of Physiology, Faculty of Medicine, Strasbourg University. The studies imply that by the reduction or absence of thyroxin due to shrinking of the thyroid gland the intensity of tissue respiration is lowered during sleep, since if hormone therapy is instituted at the time of hibernation, sleep is prevented. The adrenal gland is considered to be involved, since the absence of adrenal function induces hypothermia and eventual death. Some thought is given to the fact that the cortex of the adrenal is important as a form of regulator. K. presented a number of hypo-

MEYNARD, J.-A. (1957). Anesthésie chirurgicale du chien. [Anaesthesia of dogs.]—*Rev. Cps vét. Armée* 12, 44-51. 1916

This paper deals with pre-narcotization, respiratory failure caused by barbiturates, resuscitation, barbiturate anaesthesia by the intravenous route and epidural anaesthesia.

—T.E.G.R.

theses, admitting that this conception of winter sleep may be altered or modified by results of future studies.—R. V. L. WALKER.

MARZULLI, F. N. & CALLAHAN, J. F. (1957). The capacity of certain common laboratory animals to sweat.—*J. Amer. vet. med. Ass.* 131, 80-81. 1919

The sensitivity of the starch-iodine test for sweating was improved by painting the skin of various animals with 2% iodine in absolute alcohol, then brushing on a 1:1 mixture of soluble starch in castor oil. On a basis of comparison with man, results are discussed for tests on monkeys, dogs, horses, goats, pigs, cats, guinea-pigs, rabbits, donkeys, and rats.

—D. S. PAPWORTH.

CHOH HAO LI, COLE, R. D. & COVAL, M. (1957). Studies on pituitary lactogenic hormone. XVI. Molecular weight of the ovine hormone.—*J. biol. Chem.* 229, 153-156. [Abst. from authors' summary.] 1920

Lactogenic hormone (prolactin) isolated from sheep pituitaries appeared to be monodisperse, with a sedimentation constant of 2.19 S, when it was submitted to ultracentrifugation. The molecular weight was computed to be 24,200.

HAWKER, R. W. & ROBERTS, V. S. (1957). Oxytocin in lactating cows and goats.—*Brit. vet. J.* 113, 459-464. [Authors' summary modified.] 1921

Using a modification of the method described by Bisset & Walker (1954) [*J. Physiol.* 126, 588] two oxytocic substances were extracted from blood samples from lactating cows and goats. The possibility that potassium or 5-

hydroxytryptamine in the extracts might be interfering substances in the assay procedure was removed by dialysis or adding Dibenamine hydrochloride to the organ bath. The two oxytocic substances were assayed on the isolated sensitized rat uterus, and were differentiated from one another by treatment with sodium thioglycollate, which inactivates oxytocin but not the second oxytocic substance.

Immediately before milking, cows had the same total oxytocic activity (O.A.) and level of oxytocin in their blood as during milking; suggesting a conditioned release of oxytocin. Under similar circumstances, goats had the same O.A. immediately before as during milking, but the oxytocin level rose during milking. In both cows and goats there was virtually no oxytocin in the blood 3 hours after milking when the animals were away from the milking bails; O.A. being accounted for almost entirely by the presence of the second oxytocic substance.

ROBERTSON, P. A & HAWKER, R. W. (1957). **A second oxytocin in the hypothalamus.** — *Nature, Lond.* **180**, 343-344. **1922**

Hypothalamic extracts of cows, oxen, cats, rats and mice were placed in 0·25% acetic acid, boiled for 3 min., ground, left to stand for 30 min., and centrifuged. The supernatant was dialysed and neutralized. Residual oxytocin activities after thioglycollate treatment were obtained. It appeared that there was in hypothalamic extracts (in addition to oxytocin) a substance which stimulates the sensitized virgin rat uterus treated with atropine and dibenamine, which is non-dialysable and the activity of which is not destroyed by treatment with thioglycollate.—D. S. PAPWORTH.

GRIMSSON, H. (1957). **Oxidase activity in blood serum from different species.** — *Proc. Soc. exp. Biol., N.Y.* **95**, 476-477. **1923**

Comparative determinations of the oxidase activity of blood serum samples from human beings, sheep, cattle, dogs and g.pigs, were carried out, using *p*-phenylenediamine. Human serum contained more oxidase activity than that of either cattle or sheep. The samples from cattle and sheep were higher in oxidase activity than those from dogs and g.pigs.

—D. S. PAPWORTH.

I. BENINATI, F. (1957). **La influenza dello strapazzo sul contenuto in colesterolo totale del siero di sangue di bovini. [Effect of fatigue on the serum cholesterol in cattle.]** — *Atti Soc. ital. Sci. vet., Perugia 1956* **10**, 361-365. [English and French summaries.] **1924**

II. SIRAGUSA, F. (1957). **La influenza dello strapazzo sul contenuto in bilirubina del siero di sangue di bovini. [Effect of fatigue on the serum bilirubin in cattle.]** — *Ibid.* **366**-370. [English and French summaries.] **1925**

III. BENINATI, F., GAMBINO, U., SIRAGUSA, F. & VALENTI, G. (1957). **Sul comportamento dell'azoto totale, azoto residuo e creatinina nel siero di sangue di bovini sottoposti a strapazzo. [Effect of fatigue on the total nitrogen, residual nitrogen and creatinine in the serum of cattle.]** — *Ibid.* **371**-375. [English and French summaries.] **1926**

IV. BENINATI, F., MEDURI, A. & SIRAGUSA, F. (1957). **La influenza dello strapazzo sulla glicemia e sul contenuto in potassio nel siero di sangue dei bovini. [Effect of fatigue on the sugar and potassium content of the serum of cattle.]** — *Ibid.* **375**-379. [English and French summaries.] **1927**

I. Fatigue did not appear to have a constant effect on the total cholesterol content of the serum in slaughter cattle. There was a gradual decrease during rest in a few animals over 2 years of age.

II. There were no constant or significant changes in the bilirubin content of the serum of cattle after fatigue or during rest.

III. Fatigue in cattle constantly caused haemoconcentration and an increased nitrogen metabolism raising the total and the residual nitrogen levels in the serum.

IV. Fatigue caused a rise in the blood sugar level which gradually decreased during rest. The potassium content was not affected.—T.E.G.R.

ANTHONY, A. & PARSONS, J. (1957). **Variation in normal sodium, potassium and calcium levels in Wistar albino rats.** — *Science* **125**, 881-883. **1928**

By means of flame spectrophotometry it is shown that there exists a diurnal as well as a day-to-day variation in the serum ions of different strains of Wistar rats. The authors therefore suggest that rigid standardization of the time of sampling is necessary in those experiments where small numbers of animals are used to establish "normal" ion levels, and when the interpretation of electrolyte shifts is based on the assumption that such levels represent a stable base line.—D. S. PAPWORTH.

GOLDWASSER, E., JACOBSON, L. O., FRIED, W. & PLZAK, L. F. (1958). **Studies on erythropoiesis. V. The effect of cobalt on the production of erythropoietin.** — *Blood* **13**, 55-60. [Authors' summary modified.] **1929**

It was shown that plasma from animals that

had been injected with cobaltous chloride rapidly develops a high titre of erythropoietin. The gross properties of the active material appeared to be the same from cobalt-treated as from phenylhydrazine-treated animals. Other metal ions and a complex ion were studied as stimulants for erythropoietin formation; none was as effective as cobaltous ion with the exception of cobaltic hexamine. [See also *V.B.* 27, 3365.]

WILWORTH, A. M. (1956). O efeito de variações glicêmicas sobre a motilidade do rumen em carneiros. [Effect of changes in blood sugar on the motility of the rumen in sheep.] — *Arch. Esc. Vet. Minas Gerais* 9, 219-246. [Abst. from English summary and conclusions.] **1930**

The effects of intravenous injection of insulin, glucose, fructose, galactose and mannose on rumen motility were studied using 8 sheep with permanent closed rumen fistulas. Since slight variations of the blood sugar following intravenous injection of glucose at doses lower than 0.5 g. per kg. body wt. and of insulin at doses lower than 0.5 unit per kg. body wt. failed to alter gastric motility, and because variations of blood sugar of the magnitude of those induced experimentally in this work do not occur physiologically in ruminants, it is suggested that under physiological conditions the reticulo-ruminal centre is not controlled by the amount of sugar in the blood.

POORE, W. & HOLLANDER, V. P. (1957). Plasma ketosteroid studies in normal mice.—*Endocrinology* 61, 652-656. [Authors' summary slightly modified.] **1931**

An account of a method for the measurement of 17-ketosteroids in mouse plasma. Data are presented demonstrating plasma 17-ketosteroid values in intact, and adrenalectomized mice. The administration of corticotrophin increased the plasma 17-ketosteroids. Adrenalectomized female mice have no significant plasma 17-ketosteroid levels.

NIEDERGERKE, R. & LÜTTGAU, H. C. (1957). Calcium and the contraction of the heart.—*Nature, Lond.* 179, 1066-1067. **1932**

Isometric tensions and surface potentials of thin strips (diameter < 0.5 mm.) of the frog's ventricle were measured to evaluate the effects of calcium and sodium ions. Results showed that every known feature of the action of calcium ions on contraction can be simulated by a diminution of the NaCl concentration. The experiments support the suggestion that calcium and sodium ions compete for a compound which controls contraction.—D. S. PAPWORTH.

PHILLIPSON, A. T. (1957). Recent advances in ruminant physiology.—*Proc. VIIth Int. Grassl. Congr., Palmerston North*, 1956 pp. 229-239. Discussion: pp. 239-240. **1933**

P. gave a detailed account of some of the recent work on ruminant physiology. He described control of salivary secretion and the composition and functions of saliva. He discussed the reflex control of stomach movements and the latest theory on the belching reflex; the probable method by which ingesta pass through the stomach; the absorption by the rumen of fatty acids, chloride, sodium, potassium, inorganic phosphate and water; and absorption from the omasum; and considered factors which alter the rate of rumen movement and the blood flow to the rumen.—E. J. CASTLE.

SOMERS, M. (1957). Saliva secretion and its functions in ruminants.—*Aust. vet. J.* 33, 297-302. **1934**

S. discussed published information on factors affecting the rate of secretion, the volume of saliva secreted and the role of saliva in ruminant digestion. Original observations were that repeated application to the tongue of a swab moistened with rumen fluid increased the rate of secretion, but that the mere act of chewing had no appreciable effect on it. 0.7-0.9 g. nitrogen could enter the rumen through the saliva each day: comments were made on the significance of the urea content.—A. G. CULEY.

DENTON, D. A. (1957). The weights of the parotid glands of sheep with permanent unilateral parotid fistulae.—*Aust. J. Sci.* 19, 225-226. **1935**

D. discussed earlier reported difficulties in the establishment of parotid fistulae in sheep with the preservation of normal structure and function of this gland. Using the Pavlov-Glinski or Wright technique to transplant the parotid papilla and duct from mouth to cheek, D. achieved the continued elaboration of normal secretion and the gland remained histologically normal [*Quart. J. exp. Physiol.* (1957) 42, 72].

Here D. compares the weight of the fistulated and non-fistulated parotid glands of a series of sheep. The absence of significant weight differences is regarded as further evidence to support the contention that sheep parotids can be successfully fistulated.—K. G. JOHNSTON.

PHANEUF, L. P. (1957). Studies on the secretory activity of the duodenum, pancreas, and cecum of the sheep.—*Thesis, Cornell* pp. 97. **1936**

This project was undertaken in an effort to determine some of the characteristics of the

secretory products found in the small intestine, and to evaluate the potential importance of enzymic factors in the intestinal tract of some ruminants. It is also concerned with the possible importance of enzymic action in the secretion obtained from the caecum of the sheep. Chronic fistulas of the duodenum, pancreas and caecum were used. Gall-bladder bile from cattle and sheep was obtained at abattoirs. The total amount of fluid added to ingesta in the duodenum was about 400 ml., of which 125 ml. was duodenal juice and 275 ml. from the pancreas. The reaction of these fluids is slightly alkaline. Amylase is contributed by ovine pancreatic juice and gall-bladder bile in about equal amounts. Proteolytic enzymes in ovine pancreatic juice are apparently more active than those in the dog. Lipase was found in sheep pancreatic juice and duodenal juice, the former having about three times the activity of the latter. The sodium content of sheep duodenal and pancreatic juices was about the same as that of sheep blood serum. Pancreatic juice contained the same amount of chloride as sheep blood serum.—H. L. GILMAN.

BARONE, R., STAGNARA, P., VALENTIN, F. & WEBER, H. (1957). L'os diaphysaire, chez le poulin et le veau. (Structure—évolution—possibilités d'utilisation pour les hétéro-transplants). [Diaphysal bone in the foal and calf.]—*Rev. Méd. vét.* 108, 447-463. 1937

A study of the structure and development of long bones in the foal and calf with a view to their use for transplants in man.—T.E.G.R.

ITABASHI, H. & ISHIDA, K. (1957). Transition metal contents in the ovaries of sows during estrous cycle.—*Tohoku J. agric. Res.* 8, 11-16. [In English. Abst. from authors' summary.] 1938

Ovaries of immature sows were rich in copper (10.4 µg./g.). Ovaries of mature sows were poor in copper during dioestrus (3.8 µg. per g.). The copper content increased with the stages of oestrous cycle up to oestrus when it averaged 11 µg./g. It then began to decrease and reached the minimum in dioestrus. Nickel content was low in every stage of the oestrous cycle. Iron content varied both in individuals and in stages, according to the blood haemoglobin in the ovaries.

DE GROODT, M., LAGASSE, A. & SEBRUYN, M. (1957). Over de perivasculaire ruimte in het interstitieel weefsel van het ovarium. [Perivascular spaces in the interstitial tissue of the ovary.]—*Vlaams. diergeneesk. Tijdschr.* 26, 233-236. [In Flemish. English, French

and German summaries. English summary modified.] 1939

Electron microscopic studies revealed that the interstitial cells of the ovary of the white rat are not in immediate contact with the endothelial lining of the regional blood capillaries, but are separated from them by an irregular perivascular space. Since similar subendothelial spaces have been reported by other investigators only in preparations of endocrine tissue, the above findings add fresh morphological evidence to the many existing proofs that the interstitial cell of the ovary does produce an internal secretion.

HUTCHINSON, J. C. D. & TAYLOR, W. W. (1957). Seasonal variation in the egg production of fowls: effect of temperature and change of day length.—*J. agric. Sci.* 49, 419-434. 1940

In experiments with two groups of pullets reared to time of laying on a 23½ hour day and 12 hour day respectively, shortening of the day in the one from 23½ to 12 hours caused moulting and a marked reduction in egg production whereas in the other the birds continued to lay steadily. Exposure of subgroups to artificial thermal autumn and winter had no detectable effect on egg production nor did the lengthening of the day. In another group of pullets where the shortening of the day was completed before the birds began to lay, there was no significant effect on subsequent egg production. It seems that the essential cause of the winter pause and annual rest, in birds given supplementary lighting, is the decline in day length in late summer and autumn.—A. ACKROYD.

SHIMIZU, H. & ITABASHI, H. (1957). Biochemical studies on the egg formation in the domestic fowl. II. The electrophoretic investigation of the laying hens' serum.—*Tohoku J. agric. Res.* 8, 1-10. [In English. Abst. from authors' summary.] 1941

Comparative studies of the electrophoretic patterns of serum of laying hens with those of non-laying (broody) hens, cocks and immature cockerels were carried out. Changes characteristic of laying hens were: (1) motion of the α -fraction ahead of the albumin fraction: (2) increase in size of the γ -globulin fraction and decrease in size of the albumin fraction: and (3) reduction of the α -1-globulin fraction. The serum of broody hens had a diminished β -globulin fraction.

TANABE, Y., HIMENO, K. & NOZAKI, H. (1957). Thyroid and ovarian function in relation to

molting in the hen.—*Endocrinology* **61**, 661-666. [Authors' summary modified.] **1942**

The secretion rate of thyroid hormone in the hen during laying and moulting periods was measured by the release rate of I^{131} from the thyroid. Ovarian activity of the hen was also determined by an immunological method. The secretion rate of thyroid hormone was low, the average value expressed as daily percentage loss of thyroidal radioiodine being 3.5%. Acceleration in release rate of I^{131} from the thyroid was

not observed either in moulting or in the pre-moult period. Moult occurred, whenever lay ceased and ovarian activity decreased. Administration of thyroid stimulating hormone markedly increased release of I^{131} . Progesterone administration forced the hen to moult, but somewhat decreased the release of I^{131} . Starvation completely inhibited the release of I^{131} . It is suggested that natural autumnal moult in the hen is induced by decrease in ovarian activity, but not by the increased activity of the thyroid gland.

See also absts. 1652 (mastitis); 1654-1657 (mastitis milk); 1689 (effect of light on serum proteins); 1844 (ewe's colostrum and milk); 1905, 1906 (phyloerythrin in blood and bile); 1952 (rete testis); 1967 (skin morphology and wool production in sheep); 1977 (blood supply of muscle during exercise).

PUBLIC HEALTH, VETERINARY SERVICES AND VETERINARY EDUCATION

I. HOWARD, A. & LAWRIE, R. A. (1957). **Studies on beef quality. Part IV. The effect of combining blast-freezing of hot beef quarters with pre-slaughter injection of magnesium sulphate.**—*Tech. Pap. Div. Food Pres. Trans. No. 3, C.S.I.R.O. Aust.* pp. 16. [Abst. from authors' summary.] **1943**

II. HOWARD, A. & LAWRIE, R. A. (1957). **Studies on beef quality. Part V. Further observations on biochemical and physiological responses to pre-slaughter treatments.**—*Tech. Pap. Div. Food Pres. Trans. No. 4, C.S.I.R.O. Aust.* pp. 35. [Authors' summary modified.] **1944**

III. BOUTON, P. E., HOWARD, A. & LAWRIE, R. A. (1957). **Studies on beef quality. Part VI. Effects on weight losses and eating quality of further pre-slaughter treatments.**—*Tech. Pap. Div. Food Pres. Trans. No. 6, C.S.I.R.O. Aust.* pp. 23. [Authors' summary modified.] **1945**

I. Beef quarters from 10 grade 1 steers were used to compare the relative effects on "drip" during thawing and on palatability after cooking, of the following four treatments: blast-freezing (without previous chilling) after pre-slaughter injections of relaxant doses of magnesium sulphate, normal chilling and freezing after such injections, and corresponding non-injected controls for each method of freezing. Blast-freezing of hot quarters, in a tunnel operating at 1000 ft./min. and -40°C . (-40°F .), significantly lowered butchers' drip from hind quarters on thawing after 14 weeks' frozen storage, and also lowered laboratory drip in psoas and l. dorsi muscles and drip from 6-in. cubes in both injected and non-injected material. This technique showed a more marked effect in reducing drip than the rather slower blast-freezing previously employed. In addition, and contrary to the effects with the less powerful blast, the eating

quality of roasts and grills from the blast-frozen beef was fully as high as that from normally chilled and frozen controls. Drip from butchers' joints was unaffected by the injections.

II. Investigations on various pre-slaughter treatments on the steer were extended. Their effects were studied on the blood, liver glycogen, and biochemical changes in psoas, l. dorsi, semitendinosus, and semimembranosus muscles of 30 animals. While post-mortem glycolysis and the changes in creatine phosphate and adenosine triphosphate, causing the onset of rigor mortis, are similar in all four muscles, they differ from one another in important details such as the amounts of initial glycogen, buffering power, and the pH at which glycolysis ceases. It is suggested that such differences reflect functional specialization. Unlike its action *in vitro* in slowing adenosine triphosphate breakdown, pyrophosphate appears to accelerate glycogenolysis in liver and to cause aerobic production of lactic acid in muscle when injected before slaughter; caution is therefore needed in inferring that *in vitro* findings apply to the living animal. The considerable resistance of steers to the stresses of enforced exercise and fasting was confirmed: it again proved most difficult by these methods to deplete muscle glycogen levels sufficiently to raise the ultimate pH. The successful depletion of such reserves in a steer which was forcibly exercised after a long train journey was attributed to the nervous effects of the journey rather than to inanition or muscular activity. The injection of ephedrine failed to produce this manifestation of excitability. On the other hand, the induction of insulin tetany and of shivering (by tuberculin injections), and interference with fatty acid oxidation (by the injection of neopyrithiamin), caused a significant raising of the ultimate pH of the musculature. Ruminants appear to derive considerable energy from the oxidation of fatty metabolites, but this in no way lessens the fund-

amental importance of glycogen in muscular activity, especially when it is suddenly increased.

III. The effects of a number of pre-slaughter treatments on the carcasses of beef steers were studied. These effects include weight losses from before freezing until removal from frozen storage, thawing (as quarters), and holding (as butchers' cuts), and also the eating quality before and after frozen storage. By a series of treatments designed to modify the glycogen reserves in the animals, muscular tissue was obtained with values of ultimate pH extending fairly evenly from the normal value of about 5.5 to well above 6.0. The earlier suggestion that increased pH was associated with low value of laboratory drip, meat flavour, and acceptability was confirmed and it was further shown that

butchers' drip is similarly reduced. The earlier suggestion that tenderness is at a minimum at a pH around 5.8 received further support and the development of dark colour at high pH was also confirmed. Losses during cooking also appear to be dependent on pH. Among treatments designed to modify the physico-chemical or biochemical properties of the muscle other than through pH change, the most marked effect was that of pyrophosphate in darkening the meat. Pyrophosphate possibly also increased weight losses during cooking. The finding that the storage of frozen beef reduces juiciness was confirmed and in these experiments frozen storage was also shown to produce darker cooked meat in certain joints.

See also abcts. 1666 (TB. control in U.S.S.R.); 1667 (TB. in slaughter pigs).

REPRODUCTION AND REPRODUCTIVE DISORDERS

BLOKHUIS, J. (1957). Praktische toepassing van de K.I. bij geiten. [Artificial insemination in goats.]—*Tijdschr. Diergeneesk.* 82, 570-581. [In Dutch. English, French and German summaries.] **1946**

A discussion of the technique and results of artificial insemination of goats in the Netherlands. The diluent consisted of 3% sodium citrate, 5% egg yolk and 0.3% sulphanilamide. Between September and December of 1956, 535 goats were inseminated and 274 became pregnant after the first insemination.—R.M.

AAMDAL, J., HOGSET, I., SVEBERG, O. & KOPPANG, N. (1958). A new type of artificial vagina and a new collection technique for boar semen.—*J. Amer. vet. med. Ass.* 132, 101-104. [Authors' summary modified.] **1947**

The penis of the boar passed through a short artificial vagina and into a rubber funnel, attached to which was a collecting bottle; a bent supporting splint connected the vagina and the collecting bottle; it kept the bottle higher than the vagina and prevented the preputial secretion from flowing into the bottle. The opening into the vagina was covered with foam rubber having a central, star-shaped hole for the penis. In using the new collecting technique, the penis entered the funnel and was grasped by the right hand. When ejaculation started, the bottle was detached from the supporting splint while the tip of the penis was still held higher than the vagina. The semen flowed directly from the tip of the penis through a perforated bottle cap, which filtered off the mucus, into the bottle. Any secretion from the prepuce which might

have passed the foam rubber piece remained in the vagina and partly flowed out through the hole in the funnel. Grasping the penis in this way corresponded to natural copulation, where the penis twists into the cervical canal of the sow. Using the new artificial vagina and technique, the bacterial count of the semen was reduced by 96%, as compared with the use of an ordinary artificial vagina as used for a bull. During ejaculation, a wreath-shaped mass of mucus was formed around the tip of the penis before ejaculation of the spermatozoa-rich portion of the semen, probably to prevent the semen from flowing back into the vagina of the sow during coitus.

HESS, E. A., TEAGUE, H. S., LUDWICK, T. M. & MARTIG, R. C. (1957). Swine can be bred with frozen semen.—*Fm Home Res.* 42, 100. **1948**

Seven of 25 gilts conceived after insemination with semen stored at -95°C. for from 1 to 19 days. To one part of semen were added 4 parts of egg yolk-glucose diluent. The mixture was cooled to 5°-6°C. and glycerol was added before freezing commenced. Frozen ejaculates were thawed by placing them in water at 5°C.

—R.M.

KRISHNA RAO, C. (1957). Negative staining for the study of sperm morphology.—*Vet. Rec.* 69, 1084-1086. [Author's summary modified.] **1949**

Numerous biological stains were studied for suitability as negative stains for spermatozoa. Among the stains giving a blue background 5 to 7% aniline blue w.s., 3 to 5% Bleu de Lyon,

china blue, cotton blue and soluble blue, 7% methyl blue, 1:2 to 1:4 dilution of the stock opal blue (Bresslau) solution and ultramarine blue waterproof ink gave the best results. 2% Congo red and 5% Congo rubin preparations post-treated with HCl were also very good. Of the stains giving a greenish background, 5% new black, 10% naphthol blue and 2 to 3% fast green were the best. Among stains giving a yellow, orange or reddish background 5% Congo rubin and crimson lake waterproof ink were the best. Indian ink and 5 to 7% indulin and nigrosin were also good. It is essential to dissolve the stains in isotonic saline solutions to obviate artefacts. Negative staining technique is recommended for routine use in artificial insemination work. Spermatozoa structure of avian semen is very well preserved and clearly delineated.

BOUCHER, J. H., JR. (1957). Evaluation of semen quality in the dog and the effects of frequency of ejaculation upon semen quality, libido, and restoration of semen reserves.—*Thesis, Cornell pp. 54.* 1950

To evaluate the semen quality in dogs ejaculated on a moderate regimen and to determine the effects of various frequencies of ejaculation on semen quality, libido, and restoration of semen reserves in the dog, examination of 125 ejaculates of 25 dogs was made. Ejaculation occurs in three waves. The first is a clear fluid containing few if any spermatozoa, and is small in volume. The second fraction is milky and contains most of the spermatozoa. The third and largest fraction is a clear fluid containing few or no spermatozoa and apparently originates in the prostate gland. Semen was collected by the use of an artificial vagina, and by hand manipulation with and without the use of a teaser bitch. Hand manipulation proved much superior. The pH of the semen varied from 6.23 to 7.10. "Normal dogs should produce semen with ninety per cent. normal sperm morphology." During the frequency of one collection per two days the spermatozoa reserves were stabilized at near maximum capacity. More frequent collections tended to deplete the spermatozoa reserves. For short periods only, more frequent collections may be used.—H. L. GILMAN.

ALLEN, T. E. & GRIGG, G. W. (1957). Sperm transport in the fowl.—*Aust. J. agric. Res.* 8, 788-799. 1951

Fowl semen labelled with ^{32}P was inseminated into the vagina or uterus of hens. Only live spermatozoa passed the uterus following intravaginal insemination, but both live and dead spermatozoa reached the infundibulum in

large numbers when the semen was deposited in the uterus. It is suggested that the mechanism of spermatozoal transport differs on each side of the junction of the uterus and vagina and that the junction has a similar function to the uterine cervix of mammals.—A. W. BLACKSHAW.

RENZONI, A. (1957). Aspetti secretori dell'epitelio della rete testis di *Bos taurus*. [Secretory epithelium of the rete testis in the bull.]—*Atti Soc. ital. Sci. vet., Perugia 1956* 10, 502-505. [French and German summaries.] 1952

The epithelium of the rete testis in the bull consists predominantly of cylindrical cells with a marked secretory activity of the apocrine type. The cells contain a periodic acid-Schiff positive substance and a discrete quantity of glycogen.

—T.E.G.R.

WATSON, R. H. (1957). Wastage in reproduction in Merino sheep. An outline of recent work with particular reference to southern Australia.—*Aust. vet. J.* 33, 307-310. 1953

W. outlined losses which have been observed in Victoria through failure to mate, failure to lamb after mating, and through lamb deaths. He discussed briefly experimental approaches to the study of deaths amongst new-born lambs.

—G. ALEXANDER.

GRUNERT, E. & KRAUSE, D. (1957). Ausmerzungungsgründe und Fruchtbarkeit beim Schwein nach der Schnittentbindung. [Casualties and fertility in sows after caesarian section.]—*Dtsch. tierärztl. Wschr.* 64, 570-574. 1954

The authors discussed the late results of 149 operations. 116 of the sows were not bred from again (for various reasons); of the 32 which were served again, 24 became pregnant and farrowed normally.—R.M.

MCDONALD, L. E. & HAYS, R. L. (1958). The effects of prepartum administration of progesterone to the cow.—*Amer. J. vet. Res.* 19, 97-98. [Authors' summary modified.] 1955

An experiment involving 186 dairy cows was performed to determine if progesterone administration for about a month before parturition would affect expulsion of foetal membranes, length of gestation, subsequent lactation, body temperature, and other physiological mechanisms. There were no significant differences between the treated and control groups, as measured by these criteria. The progesterone apparently produced no ill-effects.

CSEH, S. & HORVÁTH, G. (1957). Treatment with oestrogens of cystic glandular hyperplasia

of endometrium in the bitch.—*Acta vet. hung.* 7, 139-145. [In English.] 1956

The authors consider the primary cause of the disease to be the absence of a coital nervous reflex which would normally result in the rupture of ripe ovarian follicles; these follicles therefore become cysts and influence the uterus through oestrogen production. Nevertheless oestrogen was tried in treatment owing to its known effect in suppressing pituitary gonadotrophin (follicle stimulating hormone) production in various species. Cases of pyometra were not included and penicillin was given in addition where organisms such as haemolytic staphylococci occurred in the discharge. 23 of 26 cases each receiving from 10-20 mg. of synthetic oestrogen were considered to have been cured, and for three years thereafter they remained normal. [There were no untreated controls.]

—F. L. M. DAWSON.

DODDS, E. C., FOLLEY, S. J., GLASCOCK, R. F. & LAWSON, W. (1958). The excretion of microgram doses of hexoestrol by rabbits and rats.—*Biochem. J.* 68, 161-167. [Authors' summary modified.] 1957

Hexoestrol labelled with tritium was injected s/c in arachis oil solution at microgramme dose levels into two rabbits and ten rats. One rabbit received 100 µg.; the other rabbit and the rats each received 1 µg. The outstanding feature of the metabolism of the oestrogen is rapid excretion, either unchanged or as an unidentified non-volatile metabolite. Up to 90% of the initial dose was recovered in urine and faeces. Excretion by both routes was substantial although the amount of radioactive material in the faeces was up to four times as much as in the urine. In some experiments, however, more was excreted in the urine than in the faeces. Total oxidation as revealed by the specific activity of the body water was negligible and certainly less than 2% of the initial dose. The amount of labelled material circulating attached to the blood solids and remaining unabsorbed at the site of injection after 8 hours or more was also negligible.

TALBERT, G. B., DiPILLO, F. & GORDIS, L. (1957). Antagonistic action by FSH on ovarian stimulation produced by rat pituitary gonadotrophin.—*Endocrinology* 61, 611-617. [Authors' summary modified.] 1958

A follicle stimulating hormone (FSH) preparation injected i/p or i/v twice a day for three days greatly reduced the response of the ovaries of immature rats to a homogenate of adult male rat anterior pituitary glands (RPH) administered s/c. This antagonistic effect was greatly reduced or eliminated by injecting the

FSH s/c or i/m, or by giving multiple daily injections of the FSH over the three day period. These results were interpreted as indicating that the antagonistic action was dependent on rapid absorption of the FSH preparation into the bloodstream. The antagonistic effect was demonstrable in hypophysectomized as well as in normal animals, and was not therefore the result of a reduction in the output of gonadotrophin by the animal's own pituitary gland. Evidence was presented which indicated that the antagonist acted by reducing the responsiveness of the ovary to the gonadotrophin in the RPH.

HOMBURGER, F., TREGIER, A. & CROSMAN.

M. S. (1957). Biologic activities of endometrial secretions (uterone) collected from experimental hydrouteri of mice.—*Endocrinology* 61, 634-642. [Authors' summary modified.] 1959

Endometrial secretions accumulating in the hydro-uterus of mice after ligation of the cervix had the following biological activities: Reduction of adrenal size in castrates: Induction of simple hyperplasia of the uterus in castrates: Inhibition of accelerated growth of transplanted tumours in hysterectomized castrates: Production of an acute retrobulbar haemorrhage in the eye sockets of a large proportion of mice receiving i/p more than 32 mg. of a freeze-dried crude preparation of these secretions.

BELEN'KII, N. G. & PAVLOV, V. A. (1957).

[Therapeutic serum as a stimulant of sexual function in infertile cows.] — *Veterinariya, Moscow* 34, No. 8. pp. 66-70. [In Russian.] 1960

Sterile cows were treated with "therapeutic serum" ("LSB") given i/v or s/c at 0.5-1 ml./kg. body wt. Three [?] daily injections were given and the treatment was repeated after 10 days. Subsequent fertility of treated cows appeared to be better than that of untreated cows and those treated with fresh homologous serum.—R.M.

BRÜGGEDE, J., NIESAR, K.-H., FLOEGEL, C. & GRAF, R. (1957). Neue Aspekte zur Vitamin-E-Therapie bei der Zyklussterilität des Rindes. [Vitamin E therapy of cyclic sterility in cattle.] — *Tierärztl. Umsch.* 12, 143-147. 1961

Experiments on rats were described at some length leading to the conclusion that vitamin E was likely to be more effective treatment for infertile cattle if administered intravenously than intramuscularly. The work of Gullickson *et al.* (1950) showing that normal bovine reproduction

is possible for generations in the absence of vitamin E, was not mentioned. Brüggeman admitted that any bovine effect could not be directly specific.—F. L. M. DAWSON.

Rossou, J. (1957). Invloed van het losduwen van het corpus luteum periodicum op de bevruchtingsresultaten bij repeatbreeder runderen. [Influence of expression of the corpus luteum on the fertility of cows which had failed to conceive.]—*Vlaams. diergeneesk. Tijdschr.* **26**, 237-243. [In Flemish. English, French and German summaries. English summary modified.] **1962**

Cows which had failed to conceive after the 3rd or 4th insemination were divided into 2 groups. In the animals of the first group, the corpus luteum was enucleated at the 11th or 12th day after oestrus. Over 80% of these cows came into oestrus within 3 to 7 days and were inseminated. Each cow of this test group was followed up by a control cow of the second group which was inseminated at the normal 4th or 5th oestrus.

Of the 52 enucleated cows 23 (44.2%) became pregnant after the first insemination and eventually 42 (80%) of them were in calf. In the control group, 21 (42.3%) were in calf after the first insemination. From these small-scale tests it appeared that fertility could be raised significantly by enucleation of the corpus luteum on the 11th or 12 day after oestrus. Besides that, there is the economic loss caused by illness in some enucleated cows (6%) resulting from severe haemorrhage.

WILSON, A. L. & YOUNG, G. B. (1958). Prolonged gestation in an Ayrshire herd.—*Vet. Rec.* **70**, 73-76. [Authors' summary modified.] **1963**

Nine cases of prolonged gestation (348 to 381 days) occurred in an Ayrshire herd. The calves were all offspring of one bull. Significantly more of them were produced by the daughters of one bull than by those of another

bull. These two facts suggest that the genotypes of affected calves were at least a contributory if not a sufficient cause of the condition. The birth weight of the calves was greater than normal for Ayrshires, but considerably less than would be expected if the abnormal calves had grown normally during their hypermature period. Prolonged gestation indicated that foetal weight was not an overriding factor in precipitating parturition.

TERNAN, P. R., KIDWELL, J. F. & WALKER, L. (1957). Evidence of a new lethal gene in cattle.—*J. Hered.* **48**, 81-83. **1964**

Of 11 calves of a Holstein-Friesian herd, which had either been born dead or had died during the first few days of life, a patent foramen ovale was diagnosed in the only one examined P.M. Further evidence was required to determine if this circulatory anomaly was due to a recessive autosomal gene.—E.G.

BROOKSBANK, N. H. (1958). Congenital deformity of the tail in pigs.—*Brit. vet. J.* **114**, 50-55. [Author's summary modified.] **1965**

Examination of the vertebral column in 2 piglets with defective tails from different breeds revealed irregular development of the sacral, lumbar and dorsal vertebrae in one and complete absence of lumbar and sacral vertebrae in the other. The herd histories suggested that the defects were hereditary. The condition was compared with the transmissible tail deformity occurring in Manx cats.

ABBOTT, U. K. & ASMUNDSON, V. S. (1957). Scaleless, an inherited ectodermal defect in the domestic fowl.—*J. Hered.* **48**, 63-70. **1966**

'Scaleless' is an autosomal recessive mutation in fowls, characterized in homozygous chicks by smooth, waxy skin, absence of scales and foot pads on legs and feet, absence of spurs in adult males, and absence of down feathers. Nails, beak, comb and wattles are normal. A few feathers of juvenile type are present on the head, wings, legs and tail.—E.G.

See also absts. 1871 (vitamins E and A in fowls); 1898 (ethylene dibromide).

ZOOECHNY

KRUSHCHOV, G. K. [Edited by.] (1957). [Morphology of the skin of sheep in relation to wool production.]—*Trud. Inst. Morfolozii Zhivotnyikh* No. 19, pp. 166. [In Russian.] Moscow : Izd. Akad. Nauk SSSR 11r. 20k. **1967**

This number of the collected works of the "A. N. Severtsov" Institute of Animal Morphology consists of 7 original papers with the following titles. A histological method for studying

the ontogenesis of skin and hair follicles (N. A. Diomidova); Histogenesis of skin in foetal Karakul lambs (N. D. Lagova); Embryonic development and structure of the skin of sheep (Z. S. Khluistova); Skin structure in new-born lambs of the Dagestan mountain breed at various nutritional levels (E. P. Panfilova); Morphological characteristics of developing skin of sheep kept under conditions of migratory pasturing (G. F. Mukhin); Changes in skin

structure and wool quality in sheep reared under conditions of annual pasture rotation (G. S. Avsadzhanov); Changes in the skin and wool coat in hybrid sheep (N. A. Diomidova. There is also a 5-page bibliography of Russian and other publications on sheep skin and wool. The book is illustrated by numerous photomicrographs, and costs 10s. in the United Kingdom.

—R.M.

SALMI, T. J. (1957). *Porotokasta pitopöytäään.* [The reindeer as a meat producing animal.] —*Finsk VetTidskr.* 63, 275-278 & 283-289. [In Finnish.] 1968

Before the second world war about 500,000 reindeer were kept in the north of Finland. After the drastic reduction which occurred during the war the number has now increased and at present there are 150,000 in Lapland. About 35,000 are slaughtered annually; this yields 1·6-1·8 million kg. meat. The value of a reindeer is between 6,000-12,000 marks (\$25 on an average); the most valuable part is the tongue (\$1). Most of the reindeer are small (carcass yield 40-50 kg. meat), the largest weighing 90 kg. (carcass wt.). Before 1935 about 50,000 kg. reindeer meat was inspected in Oulu, but inspection at the places where the animals are slaughtered is now considered more effective.

—H. WESTERMARCK.

LAMMING, G. E. & BROOME, A. J. W. (1957). The effect of implanting diethyl-stilboestrol and hexoestrol on the growth of fattening sheep and cattle.—*Proc. Nutr. Soc.* 16, No. 2, pp. xxvii-xxviii. of Proceedings. 1969

384 sheep were used to determine the effect of varying doses of stilboestrol and hexoestrol, with or without excipient, on weight gains and killing-out percentages. Both preparations were equally effective as growth promoters, but the addition of excipient reduced the initial response. The rate of weight gain of 10 steers implanted with stilboestrol was 55% greater than that of controls, whilst that of 11 treated females was only 15½% greater than that of controls.—E. J. CASTLE.

SMITH, R. G. C. (1958). Hexoestrol—grazing cattle. —*Agric. Rev., Lond.* 3, 29-34. [Author's conclusions modified.] 1970

Bullocks being fattened off grass respond

to hexoestrol implantation with an extra daily live wt. gain of about 0·5 lb. A dose of 60 mg. of hexoestrol, implanted under the skin at the back of the ear, can be regarded as the optimum dose implanted in the only safe place. Increasing the dose above this level produces no significantly greater live wt. increase and has a marked tendency to lower the quality of the carcass. Bullocks should be in the final stage of fattening before being implanted, the optimum live wt. being determined in relation to the degree of early maturity. The heavier the bullocks at implantation, the greater is likely to be their response to hexoestrol in terms of live wt. gain. Provided that the grazing is good, neither the age of the grass nor its manurial treatment prior to grazing would appear to affect the response to hexoestrol treatment. It must be stressed that misuse of hexoestrol by beef producers will result in the loss of the financial benefit that can accrue from its proper use.

PRESTON, T. R. & GEE, I. (1957). Oestrogens in lamb and mutton production.—*Proc. Brit. Soc. Anim. Prod.* 1957, pp. 41-48. [Authors' summary copied verbatim.] 1971

Sucking lambs implanted with hexoestrol reached a slaughter weight of 80 lb. twelve days sooner than untreated lambs and as a result of this earlier disposal commanded a significantly higher price per lb. Hexoestrol implantation of weaned lambs and draft ewes caused a significant increase in live-weight gain and an apparent improvement in carcass quality.

WILSON, P. N. (1957). Studies of the browsing and reproductive behaviour of the East African dwarf goat.—*E. Afr. agric. J.* 23, 138-147. [Abst. from author's summary.] 1972

Goats spent over half their browsing time eating the leaves and shoots of trees and bushes, mostly thorny acacias. Grasses were eaten but generally only the inflorescence, and there was no evidence of goats preventing the establishment of grass. They preferred succulent shoots at about head height. Very few species were consistently rejected. The mean gestation period was 146½ days. Pregnant goats occasionally accepted service, 14 such instances being proved. The mean number of services per kid born was 2·3.—M.G.G.

TECHNIQUE AND APPARATUS

GOODMAN, F. D. (1957). Combined acid-fast and Gram-staining procedure for bacterial films. —*Amer. J. clin. Path.* 28, 427-428.

[Interlingua summary.] 1973

An account of a combination of the Ziehl-Neelsen and Gram methods using malachite green as a counter-stain.—T.E.G.R.

RAPPAPORT, C. (1957). Colorimetric method for estimating number of cells in monolayer cultures without physiological damage. — *Proc. Soc. exp. Biol., N.Y.* **96**, 309-316. [Author's summary modified.] **1974**

The number of cells in monolayer cultures of monkey kidney cells was estimated, without causing physiological damage, by measuring the change in absorption of a phenol red soln. after a 15-sec. exposure under standard conditions. These conditions include the use of a standard salt soln., the quantity of titratable phenol red, and buffering salt, and the use of one type of glass. The change in absorption is due to the production of hydrogen ion by the cells. It is critically dependent on the presence of potassium but independent of an exogenous carbon source, and independent of endogenous polysaccharide reserves over a wide range. The method may be sufficiently independent of cell age and metabolism to be reliable for the estimation of growth in cultures.—M.G.G.

MCLIMANS, W. F., GIARDINELLO, F. E., DAVIS, E. V., KUCERA, C. J. & RAKE, G. W. (1957). Submerged culture of mammalian cells: the five liter fermentor.—*J. Bact.* **74**, 768-774. [Authors' summary modified.] **1975**

Growth of "L" cells was attained under a variety of conditions in a 5 l. fermentor, a prototype of the antibiotic fermentors. It was demonstrated that mammalian cells could be grown on a large scale in submerged culture.

BURSTONE, M. S. (1957). Polyvinyl pyrrolidone as a mounting medium for stains for fat and

See also absts. 1672 (maintenance of cultures of mycobacterium); **1732** (identification of *Candida albicans*); **1757 & 1758** (toxoplasma dye test); **1775** (paper disk technique for collection of blood for virus neutralization tests); **1851** (polythionate reagent for determination of protein in urine); **1853** (amino-acid in urine); **1857, 1858** (determination of Ca); **1858** (determination of Mg); **1905** (determination of phylloerythrin in blood); **1949** (negative stains for spermatozoa).

MISCELLANEOUS

BIGGERS, J. D., WEBB, M., PARKER, R. C. & HEALY, G. M. (1957). Cultivation of embryonic chick bones on chemically defined media. — *Nature, Lond.* **180**, 825-828. **1978**

The femora and tibiae from $6\frac{1}{2}$ to 7-day-old chick embryos were cultivated in a medium containing glucose and in one containing serum. Tissues grown in the serum medium were the more normal in shape and generally the heavier. From measurements of size, histological studies, and biochemical tests it was shown that growth

for azo-dye procedures.—*Amer. J. clin. Path.* **28**, 429-430. [Interlingua summary.] **1976**

Polyvinylpyrrolidone is dissolved in distilled water (50 g./50 ml.) and allowed to stand overnight; 2 ml. glycerol are then added and the mixture is stirred (a crystal of thymol may be used as a preservative). All of the dyes tested except eosin were well preserved during 4-6 weeks; cover glasses became immovable within an hour after mounting and the formation of bubbles was minimal. Preparations retained their clarity for several months.—T.E.G.R.

WALDER, D. N. (1958). A technique for investigating the blood supply of muscle during exercise.—*Brit. med. J.* February 1st, 255-258. [Author's summary modified.] **1977**

An account of an objective test using radioactive isotopes for the evaluation of vascular sufficiency in muscle during exercise. The apparatus is readily available commercially, and in fact is already possessed by most hospital physics departments. This test assists in the diagnosis of intermittent claudication by giving additional evidence in doubtful cases. It enables vascular insufficiency to be detected early. The exact muscle affected can be located. The test also enables treatment to be assessed objectively. The technique described provides a useful tool for research into the problems of muscle blood flow. Observations made so far using this technique would seem to suggest that the fundamental requirements in claudicating muscles are an increase in the pressure of blood available in the arteries supplying the muscle or a decrease in the tension developed within the muscle during contraction.

processes can be studied in embryonic bones cultivated in chemically defined media.

—D. S. PAPWORTH.

ROUSSEAU, M. (1957). Guide de bibliographie vétérinaire précédé par le doctorat vétérinaire. [Guide to veterinary bibliography and to the veterinary doctorate.] pp. 116. Paris: Editions Documentaires Industrielles et Techniques. **1979**

A comprehensive guide to veterinary literature. Designed for the use of students, this work

will also be of value to librarians. In addition to the purely veterinary literature, selected works in medicine, agriculture and general science are listed. There is also a guide to the writing of a thesis for the veterinary doctorate.

R. pleads for the establishment of a national centre for veterinary documentation at the Alfort Veterinary School. The work has been duplicated from typescript and has a paper cover.—R.M.

REPORTS

AUSTRALIA. Northern Territory Administration.
Animal Industry Branch. I. (1955). Ninth annual report 1954-1955. (Covering activities for year ending 30.6.55.). II. (1956). Tenth annual report 1955-1956. (Covering activities for year ending 30.6.56.). III. (1957). Eleventh annual report 1956-1957. (Covering activities for the year ending 30.6.57.). [ROSE, A. L.] pp. 26, 29 and 43. 1980

I. In an outbreak of STRANGLES in horses vaccination with dried culture vaccine was successful. A herd of 200 cattle at a Mission station had 45% reactors to the tuberculin test and was slaughtered and replaced with 300 breeding cows. The Alice Springs district has remained free from BOVINE CONTAGIOUS PLEUROPNEUMONIA, but cattle which move into South Australia are inoculated beforehand. Work on the intracaudal vaccination of stud cattle with concentrate formol suspension of the organism was continued. Serological data show that the method confers a high degree of resistance.

There were few cases of TICK FEVER but a number of cases of ANAPLASMOSIS were reported. Pure strains of *Anaplasma centrale*, *Babesia argentina* and *B. bigemina* are maintained for the immunization of cattle.

Continuation of the 1954 drought made conditions inimical for the cattle tick (*Boophilus microplus*), but the following season was very wet and ticks multiplied tremendously.

The incidence of OSTEOMALACIA (PEG LEG) of cattle continued, and a phosphatic supplement, monosodium orthophosphate, was provided by an automatic dispenser supplying water troughs. Studies are being continued on the influence of protein, carotene or any other substance upon the disease.

Studies on POISON PLANTS showed that the toxicity of *Atalaya hemiglaucha* varies with the maturity of the leaf and the geographical location of the plant. *Duboisia hopwoodi* associated with mortality in cattle contained 1% nor-nicotine but not nicotine. Chemical analysis of the known poison plant *Gastrolobium grandiflorum* showed that neither alkaloids, saponins nor glucosides were present. *Eremophila maculata* did not contain cyanogenetic glycoside. *Indigofera enneaphylla*, the cause of BIRDVILLE DISEASE of horses, failed to show the presence of β -nitro propionic acids. *Crotalaria novae-hollandiae* was

strongly positive for saponins. The following were negative for alkaloids, *Solanum elletticum*, *Scoitiana velatina*, *Crotalaria novae-hollandiae* and *Euphorbia eremophila*. Since the cause of KIMBERLEY HORSE DISEASE was shown to be *Crotalaria retusa* many stock-owners run their horses on country where the plant does not occur. A technique has been developed for liver biopsy in horses used in experimental work, and periodical observations have been made on the pathological changes taking place in the course of the disease. Work on GEORGINA RIVER DISEASE is directed towards discovering why the tree *Acacia georginae* is toxic in certain districts but not in others. There are indications that toxicity may be influenced by soil constituents.

The report has data on livestock numbers, seasonal conditions, staff changes and activities, developments of stock routes, legislation, and control of noxious animals.

II. Many cases of TUBERCULOSIS continue to be reported in cattle slaughtered at Darwin and Wyndham but little can be done to control TB. until staff and facilities are increased. An outbreak of disease in a herd travelling by rail closely resembled PASTEURELLOSIS (PULMONARY HAEMORRHAGIC SEPTICAEMIA). An outbreak of BOVINE CONTAGIOUS PLEUROPNEUMONIA in cattle from the Alice Springs district resulted in infected animals entering South Australia. Immediate slaughter prevented extension in that State. Inspection of 30,160 cattle and vaccination of 24,000 soon eliminated the outbreak. A Protected Area consisting of 200,000 sq. miles in the Northern Territory and 208,000 sq. miles in South Australia has been created. In laboratory studies no antigenic variants were discovered and there was no antigenic relationship between the causal organism of bovine contagious pleuropneumonia and the organisms of actinobacillosis and actinomycosis. The formolized vaccine developed in the laboratory appears to be a useful addition to the standard vaccine for the immunization of "soft bred" animals (stud and dairy stock). The method consists of 1 ml. formolized vaccine, followed 7 days later by 0.2 ml. V5 C.S.I.R.O. vaccine inoculated intracaudally.

Several outbreaks of TICK FEVER occurred. In one, 50% of cattle were affected and there were 50 deaths.

EPHEMERAL FEVER occurred in many herds of travelling and other cattle. If travelling herds were rested losses were avoided.

Siphona (Lyperosia) exigua extended further south than in any previous year. Although seasonal conditions were very favourable for *Boophilus microplus* heavy infestations did not extend beyond normal limits, possibly because control by dipping was better than in previous years.

OSTEOMALACIA (PEG LEG) was uncommon except in the southern part of the Northern Territory where drought persisted.

Several outbreaks of BIRDSTVILLE DISEASE of horses were reported. Although much chemical investigation has been carried out, the toxic principle of *Indigofera enneaphylla* has not been identified. Guinea-pigs fed on the plant consistently show damage to the glomeruli and tubules of the kidneys. Damage to liver and heart has been inconsistent. Further study of the nervous tissue from experimental cases in horses showed unilateral damage to the sheaths of femoral and median nerves and also in dorsal roots of various sections of the cord. These changes are in harmony with the one-sided gait of horses developing symptoms. Studies on a horse which had resisted poisoning both with the plant, *Crotalaria retusa*, and its active principle (monocrotaline) were continued and liver biopsy sections revealed slow progressive degeneration. Chemical studies on *Acacia georginae*, the cause of GEORGINA RIVER DISEASE of cattle showed that the active principle is an extremely water-soluble polysaccharide containing nitrogen. A somewhat similar compound was isolated from trees which were not toxic but its nitrogen content was less. Other work on poison plants included death of a horse from Comet Grass (*Perotis rara*) seeds, suspected mortality from *Gastrolobium grandiflorum*, *Portulaca filifolia* and poisoning of horses thought to be due to *Swainsona* sp.

The report has the usual data on livestock numbers, seasonal conditions, staff changes and activities, developments of stock routes, legislation and control of noxious animals.

III. On two properties where the incidence of TB. was high the entire herds were tested and reactors sent to Adelaide abattoirs. Among 11,305 cattle on one property there were 1,094 (17.1%) reactors, and on the other, among 6,087 there were 438 (7.2%) reactors. As a result of the tests store cattle from both properties are now admitted into South Australia. PASTEUR-ELLOSIS was diagnosed in cattle and it is thought that in certain cases a laboratory differentiation will be required between this disease and BOVINE

CONTAGIOUS PLEUROPNEUMONIA. A campaign of vaccination against BOTULISM was begun. Of 721 cattle slaughtered at Alice Springs 12 yielded *Actinomyces bovis* and 29 *Actinobacillus lignieresii*. Inoculation against BOVINE CONTAGIOUS PLEUROPNEUMONIA has been adopted widely and many large properties now regularly carry out calfhood vaccination. No vaccinations were carried out in Central Australia Protected area and there was no evidence of the disease there. The development of this project has been very beneficial to the beef industry of the Northern Territory. A microcomplement fixation test was devised and may be carried out in the field. It was more sensitive than the ordinary c.f. test. No antigenic variants were found in 12 strains isolated from cases in the field.

Cases of TICK FEVER occurred in several travelling herds. Two outbreaks showed clinical and P.M. differences from cases usually seen. It appears that *Theileria mutans* was responsible.

Infestations with *Boophilus microplus* were heavy until early in 1957. Installation of a dip on a major stock route has reduced the incidence of ticks and facilitated the admittance of cattle into Queensland.

BIRDSTVILLE DISEASE of horses was prevalent in some districts and mortality reached 60%. Control measures were based on removing horses from areas where *Indigofera enneaphylla* is prevalent, or feeding on bought fodder. Surveys are in progress to ascertain whether the plant may be controlled by grazing with sheep. In the laboratory work was directed on the hypothesis that the final result of poisoning by the plant is a deficiency of vitamin E. Tocopherol will be administered to natural cases. The spectacular control of KIMBERLEY HORSE DISEASE obtained in Western Australia by restricting the grazing range of horses was not paralleled in the Northern Territory because there the plant is more widespread, not being restricted to watercourses. Investigations on GEORGINA RIVER POISONING in cattle have eliminated deficiencies of minerals as a causal factor. Attention was given to the water status of the tree (*Acacia georginae*) and of the soil. There is evidence that trees growing in an area of adequate soil moisture are not poisonous, while those growing in dry areas are toxic for cattle. Affected cattle show degeneration of heart muscle.

Rabbits, kangaroos, dingoes, buffaloes (which have increased tremendously since shooting for hides almost ceased 4 years ago) wild horses, donkeys and camels are listed as noxious animals.—H. McL. GORDON.

Agriculture and Stock for the years 1955/56 and 1956/57. pp. 126 & 123. Brisbane: A. H. Tucker, Govt. Printer. [Report of the Division of Animal Industry (1955/56) pp. 22-28 & 70-79. (WEBSTER, W.) (1956/57) pp. 22-28 & 69-98. (BELL, A. H.)] **1981**

I. *Str. zooepidemicus* was recovered from cases of MASTITIS which showed brownish milk with clots and had an offensive odour. The cases were acute with fever, listlessness, inappetence and arthritis. New areas were gazetted in the TUBERCULOSIS eradication scheme. About 800,000 dairy cattle are now under regular test. Where the scheme has been in progress for two or more years the incidence is less than 1%. When testing has been in progress for four years or more the incidence is less than 0.1%. The incidence in beef herds is causing concern and it is proposed to test all sale bulls. There was no evidence of transmission of ovine BRUCELLOSIS when a ram which was excreting the organism in the semen was mated with 29 ewes. BRUCELLOSIS in cattle is still a common cause of abortion and sterility but chief attention has been given to VIBRIOSIS and LEPTOSPIROSIS, both of which are widespread. Treatment by intra-uterine infusion of streptomycin combined with either penicillin or sodium sulphadimidine solution has given very good results. Field evidence supports the occurrence of an otherwise symptomless LEPTOSPIRAL ABORTION in cattle very similar to that seen in pigs. Abortions usually occur at 5 to 7 months of pregnancy, and in one herd 19 of 21 cows aborted within 10 days. Experimental LEPTOSPIROSIS in pigs resulted in some stillbirths and mummified foetuses. BOVINE CONTAGIOUS PLEUROPNEUMONIA vaccination appears to have reduced the incidence in cattle slaughtered at northern abattoirs. Recording of cases in slaughtered cattle has enabled the location of several areas where the disease appears to be enzootic. A pleuropneumonia-like organism was recovered from the peritoneal cavity of a goat which died from peritonitis. The organism has some antigenic relationships with the causal organism of BOVINE CONTAGIOUS PLEUROPNEUMONIA.

CHRONIC RESPIRATORY DISEASE is a serious cause of economic loss in the poultry industry. Treatment by injection of streptomycin resulted in increased egg production and growth.

CONTAGIOUS FOOT ROT of sheep was diagnosed for the first time since 1950. Foot abscess was prevalent.

Dried buttermilk 8% in the diet of chickens reduced the mortality in experimental cases of COCCIDIOSIS, but if the dose of oocysts was increased or the birds were exposed to cold, or

starved, the effect of the buttermilk was nullified. In winter COCCIDIOSIS was more acute than in summer.

ANAPLASMOSIS caused mortality in bulls introduced to North Queensland. Treatment with aureomycin (injected i/v) appeared to be promising.

There was a widespread outbreak of EPHEMERAL FEVER in cattle which spread from the north-west to the south and south-east. Generally mortality was slight, less than 1%, but morbidity varied from 10 to 100%. Recurrences and recrudescences were common, and more severe than the original outbreaks. Mastitis was a frequent complication.

The STICKFAST FLEA (*Echidnophaga gallinacea*) was found at several localities distant from the originally infested area. "Jetting" with malathion was inferior to dieldrin or aldrin in control of sheep blowfly. Diazinon protected against strike for as long as 33 weeks in one trial, and 16 to 18 weeks in a second trial under very wet conditions. Length of wool did not appear to affect protection afforded by dieldrin and diazinon. Systemic injection of dieldrin, aldrin or BHC provides protection for some time but toxic hazards are too great. A comparison of dieldrin, aldrin, diazinon and sodium arsenite for "jetting" to control BREECH STRIKE in ewes demonstrated the superiority of dieldrin and diazinon. Widespread use of the long-lasting insecticides dieldrin and aldrin appeared to have prevented a major fly wave although seasonal conditions were favourable. The wet seasons favoured the extension of *Siphona (Lyperosia) exigua* into the southern regions. The general policy of spraying all infested cattle moving from affected to fly-free areas was maintained. Cattle ticks (*Boophilus microplus*) resistant to the chlorinated insecticides are now widespread in Queensland although there are still some herds where these compounds are providing control. Trials showed that organic phosphorus insecticides can control ticks resistant to other insecticides. Double treatment with organic phosphorus compounds, twice within 24 hours, showed promise for ridding cattle of ticks at clearing centres so that they can enter tick free regions with a minimum delay.

Outbreaks of acute HAEMONCHOSIS were common in young sheep. Burdens of 2000 fourth stage larvae, but no adults, were found in the abomasum of sheep drenched with phenothiazine 7 to 8 days before. Even frequent drenching did not prevent mortality unless the sheep were moved to an uncontaminated environment.

Treatment of cattle by i/m injection of copper compounds at intervals of 3 to 4 months

resulted in marked improvement in condition and was more effective than drenching with copper sulphate. In districts where COPPER DEFICIENCY occurred in sheep the provision of a Cu supplement resulted in greater economic returns from wool. A sporadic disease of young cattle has been recognized in the Ipswich area of Queensland for some years. There is a variable nasal discharge, sometimes with peeling of the nose and incoordination of gait, progressing to paralysis. Slight meningitis was the only lesion seen P.M.

Among causes of POISONING in pigs were nitrite from vegetable tops, carbolic acid and sodium fluoride. In calves creosote was responsible for one outbreak while there were deaths following spraying with toxaphene, BHC, and dieldrin for control of cattle tick. In fowls there were cases of SALT POISONING and one where ingestion of D.D.T. residues was responsible. Sheep died after being drenched with 1 oz. of 20% D.D.T. containing 10% carbolic acid in mistake for an anthelmintic mixture. A disease in horses with severe laminitis and sloughing of the hooves, mane and tail was seen in the Cape York peninsula. It occurred late in the year after burning of pastures. SELENIUM POISONING was suspected and one plant, *Morinda reticulata*, contained 70 p.p.m. of selenium. Heavy mortality and photosensitization occurred in sheep after ingestion of *Terminalia oblongata*. Other poison plants which caused losses were *Cestrum parqui*, *Solanum laciniatum*, *Cheilanthes sieberi*, *Trema aspera*, *Datura stramonium*, *Anagallis arvensis*, *Alstonia constricta*, *Melia dubia*, *Lantana camara*, *Pteris aquilina*, *Passiflora* spp., *Xanthorrhoea* spp., *Gastrolobium grandiflorum* and *Xanthium pungens*. *Crotalaria mucronata* was suspected of killing sheep, but feeding tests were negative. *Cryptostegia grandiflora* was suspected of causing sudden death in cattle. *Myoporum deserti* appeared to cause jaundice, liver damage and haemorrhages in pigs. *Cupressus goeriana* seeds were suspected of causing deaths of fowls. *Pratia concolor* was fed to a bovine for 38 days with ill-effects. *Ranunculus scleratus* did not irritate the mouth of sheep or cause ill-effects when eaten. *Podolepis longipedata* was suspected of poisoning sheep, but no ill-effects were seen when it was force-fed over 10 days; it was unpalatable. There were outbreaks of NEONATAL MORTALITY in calves in several districts. Clinically most calves were normal at birth but died within 24-48 hours. Many cases were almost symptomless but others had convulsions, opisthotonus, hyperesthesia and periodic tonic spasms. The chief lesion was massive haemorrhage into the muscles, especially in the

femoral area. A search for plants which may have caused liver damage during foetal life suggested that *Erigeron floribundus* (fleabane) or *E. bonariensis* may have been responsible.

Other diseases noted include TRICHOMONIASIS, EPITHELIOMA of the eye of cattle, QUEENSLAND ITCH and STRANGLES in horses, MELIOIDOSIS in pigs, URETHRAL CALCULI in sheep, and CANCER OF THE VULVA in short-tailed ewes. There is considerable information on nutritional and production work with sheep, dairy and beef cattle, pigs and poultry.

II. A pasteurella was isolated from the milk of cows in one herd for over 12 months. Affected cows showed acute MASTITIS withropy milk and there were severe systemic effects. Lancefield Group O streptococci were recovered from a herd in which 20 of 25 cows showed systemic effects and painful quarters with brown milk. Streptococci were associated in pigs with severe septicaemic disease with symptoms of fever, lameness, swollen joints, stiffness and convulsions, and death of 16 of 31 piglets.

The serum agglutination test proved unsatisfactory for the detection of animals infected with MELIOIDOSIS and attention has been directed to a complement-fixation test.

Chromobacterium violaceum was isolated from abscesses in a pig and it was found in swamp water. It proved pathogenic for mice and guinea-pigs.

SWINE ERYSIPelas killed 30 of 130 pigs in one week.

In a severe mortality from HEAT STROKE in cattle held in yards at abattoirs *Salmonella bovis-morbificans* and *S. derby* were recovered from heart and lungs and it is thought that these organisms may have been an accessory factor.

More than 50,000 calves were vaccinated with Strain 19 for control of BRUCELLOSIS. The results of vaccination have been very satisfactory but there were a few deaths after vaccination, apparently from anaphylactic shock.

Further work on ovine BRUCELLOSIS was directed towards determining the infectivity, for ewes, of rams excreting the organism in semen. The organism was not isolated from two lambs which died soon after birth, nor from milk.

BOTULISM was one of the causes of ataxic symptoms in cattle in certain coastal areas. Ingestion of the plants *Xanthorrhoea* spp. and *Macrozamia* spp. also causes ataxia.

VIBRIOSIS was widespread and it may occur without serious effects on fertility. Treatment by intra-uterine injection of streptomycin and penicillin was usually effective but a fair number of treated cows returned to service during the next 3 to 4 months.

Foot Rot in pigs, from which spirochaetes and fusiform organisms were isolated, responded to treatment with penicillin.

There were fewer cases of acute LEPTO-SPIROSIS in calves, but the number of abortion "storms" associated with high blood agglutination titres to *Leptospira pomona* and *L. mitis* have increased. The syndrome of bovine abortion not associated with sterility but in which there is a positive leptospira agglutination titre was reported in considerable numbers of cows. *L. hyos* was the causal organism in 25% of cases, the remainder being *L. pomona*. A killed *L. pomona* vaccine has been used in cows and sows, but no results were available. Leptospira were recovered from the urine of aborting cows but only degenerated forms were found in foetuses and cultures were unsuccessful. Still-births occurred in sows experimentally infected with *L. hyos* but an accompanying infection with *Escherichia coli* complicated the interpretation of the trial.

Considerable extension work was carried out on the control of BOVINE CONTAGIOUS PLEURO-PNEUMONIA. Vaccination within the previous six months of all store cattle originating from, or passing through defined enzootic areas, and of fat cattle which will be travelling for more than 28 days, is obligatory.

Studies on synergism between sulphonamides and pyrimethamine did not confirm the observations of overseas workers on COCCIDIOSIS in poultry. Epidemiological studies have begun on the protozoan diseases forming the TICK FEVER complex. Blood smears from calves up to 12 months old did not show *Theileria mutans* although the calves were running with adult cattle harbouring the parasite and infested with *Boophilus microplus*. A preliminary experiment suggested that calves born to cows immune to *Babesia argentina* were resistant to this parasite. Serum from recovered cattle does not appear to have any protective properties. Chemotherapeutic studies show that cases which do not respond to the quinoline compounds can be treated effectively with euflavine. Blood for injections to immunize cattle has been stored successfully under deep freeze in 7.5% glycerol for six weeks. In a severe outbreak of TICK FEVER the causal organism was *Babesia bigemina* instead of the usual *B. argentina* which is the common cause of outbreaks in Queensland.

Unusual losses occurred in a flock of lambs in which INFECTIOUS LABIAL DERMATITIS combined with MYCOTIC DERMATITIS killed 70 of 320 lambs 1 to 3 weeks old. Pustular scabs on the lips prevented sucking and there were lesions on the ears and coronets.

Sporadic outbreaks of INFECTIOUS LARYNGO-TRACHEITIS occurred and 11,000 birds were vaccinated. Favourable results were obtained in an attempt to eradicate CHRONIC RESPIRATORY DISEASE in a hatchery. An infected breeding flock was treated with streptomycin by subcutaneous injection and eggs for hatching were collected for a limited period. Chicks from these eggs were reared in isolation and remained free from the disease. Chlortetracycline (aureomycin) in drinking water has rapidly reduced mortality and increased production in poultry where BLUECOMB occurs.

PSITTACOSIS was found in many parrots and finches.

"Jetting" down the back with dieldrin or aldrin provides control of BODY LICE on sheep but does not eradicate the parasites. Eradication is essential in travelling flocks. STICKFAST FLEA (*Echidnophaga gallinacea*) has spread further during the year. Studies on protection of sheep against BODY STRIKE by the BLOWFLY were continued. In one trial diazinon gave much shorter protection than in previous trials, but no reason could be found for the failures. 0.04% diazinon applied as a tip spray along the back at 1 to 2 pints per sheep did not prevent strike for more than 8 weeks. A concentration of 0.1% gave erratic results but was generally effective for 19 weeks. Dieldrin as a tip spray at 0.1% was not effective at 4 weeks after spraying. An organic phosphorus compound, "Notox" (L13/59), was not effective 3 weeks after application. Larvae of *Boophilus microplus* were not found on pastures after 17 weeks in winter or 11 weeks in summer when engorged females had been placed in test areas among grass tussocks. A fall of 4.5 inches of rain in a few hours did not reduce the number of larvae on grass. Eggs on high ground remained viable after 11 in. of rain, but immersion in muddy water for 24 hours just before hatching greatly reduced the number of larvae which emerged. Immersion for 5 days destroyed the eggs. Two treatments at an interval of 8, 16 or 24 hours with 0.05% diazinon or 0.5% malathion destroyed all ticks on cattle and horses without causing ill-effects to the animals. Prefabricated steel dipping vats have been installed in many areas.

SPARGANOSIS was seen in several lots of feral pigs and in some domestic pigs run in swampy country. HAEMONCHOSIS and OESOPHAGOSTOMOSIS were prevalent in sheep. *Oxyspirura mansoni* is becoming more common in some southern districts. Sudden deaths in pigs were associated with rupture of the aorta. Blindness in 100 of 3,500 sheep was associated with degen-

eration of the optic disk and destruction of the optic nerves.

There were two outbreaks of POISONING in cattle dipped in aldrin. Deaths occurred in chickens treated with sulphaquinoxaline and nitrofurazone. Severe losses in horses from BIRDsville DISEASE occurred when there was prolific growth of the causal plant *Indigofera enneaphylla* after good rains. In districts where horses' hooves showed changes suggestive of SELENIUM POISONING large amounts of the element were found in the plants *Morinda reticulata*, *Sesbania* sp. and *Neptunia gracilis*. A feeding trial with *M. reticulata* produced lameness and abnormal hoof changes. *Xanthorrhoea hastata* was shown to be a cause of the cattle disease known as "WAMPS". Other species of *Xanthorrhoea* also produce the disease. Field reports suggested that ingestion of *Trachymene glaucifolia* may be responsible for deformities in lambs known as "BENT LEG", but feeding trials with the mature plant gave negative results. Outbreaks of HUMPYBACK in sheep followed ingestion of *Solanum esuriale*. Plant poisoning followed ingestion of *Xanthium pungens*, *Lantana* spp., *Trema aspera* var. *viridis*, *Pratia concolor*, *Verbesina enceloides*, *Gastrolobium* spp., *Pteridium aquilinum*, *Xanthorrhoea* spp., *Cestrum parqui*, *Terminalia oblongata*, *Nicotiana* spp., and *Thevetia peruviana*. Other plants under suspicion were *Ranunculus undosus*, *Careya australis*, *Solanum pseudocapsicum*, *Datura stramonium*, *Planchonia careya*, *Trema aspera* and *Melia dubia*.

In a preliminary field trial there was some evidence that neonatal mortality of calves may have been due to an anticoagulant factor of vegetable origin, analogous to the coumarol syndrome. Treatment of the cows with vitamin K appeared to reduce the incidence in calves.

Differences recorded in liver copper storage of sheep and cattle grazing the same pasture may indicate that cattle are more susceptible to substances which interfere with copper metabolism. A preliminary experiment indicated that moderately high levels of molybdenum and inorganic sulphate in the ration interfered with copper storage to a similar extent in sheep and cattle.

The prevalence of many common diseases is noted and there are extensive records of work on nutrition, fertility and management.

—H. McL. GORDON.

I. & II. AUSTRALIA. SOUTH AUSTRALIA. (1956 & 1957). The Institute of Medical and Veterinary Science. Seventeenth Annual Report of the Council, July 1954 — June 1955 and

Eighteenth Annual Report of the Council, July, 1955—June, 1956. pp. 113 & 109. Adelaide : K. M. Stevenson, Govt. Printer.

1982

I. The examination of lesions in lymph nodes from pigs for *Mycobacterium tuberculosis* and the typing of the strains was continued. Glands were divided into five groups. Group 1, "Mottled Glands", contained no distinct lesions but had fine white striations. Group 2 nodes had a large encapsulated abscess with creamy pus. Group 3 lesions could be fairly easily enucleated, often leaving a capsule. Group 4 lesions could not be enucleated or only with difficulty. Group 5 had marked enlargement with extensive masses of dry, granular-calcareous material which often occupied the whole of the lymph node. Lesions in groups 1 and 2 were considered pseudo-tuberculous, those in group 3 were probably pseudo-tuberculous while those in groups 4 and 5 were presumed due to *Mycobact. tuberculosis*. Details are given of the typing of the strains of *M. tuberculosis* isolated. Most were of the avian strain. If generalized lesions are present the bovine strain of *M. tuberculosis* is the most likely cause. If lesions of groups 4 and 5 are present avian TB. is probably responsible. Lesions of groups 1 and 2 are probably sterile or due to *Corynebact. equi*. Group 3 lesions require careful examination but are probably not tuberculous. There were indications that rams could become infected with ovine BRUCELLOSIS by serving a ewe recently served by an infected ram. Of 88 ewes mated with infected rams only 7 showed evidence of infection. Of these 7 only 5 lambed and of the 5 lambs only 3 were serologically positive. Ewes probably play only a minor role in the spread of the disease. Pleuropneumonia-like organisms isolated from RESPIRATORY DISEASE in fowls were resistant to penicillin and thallium but not to streptomycin.

No direct evidence has been obtained that a pneumonia virus similar to that described from sheep in the U.S.A. occurs in South Australia but the investigation is proceeding. Many sheep proved to have antibodies to viruses of the Psittacosis-Lymphogranuloma group which were not the result of infection with the virus of enzootic abortion. A strain of MYXOMATOSIS virus of low virulence was isolated from rabbits. There is a high level of INFECTIOUS LARYNGOTRACHEITIS neutralizing antibodies in practically all poultry in South Australia and work on the propagation of the organism in eggs has thus become very difficult. Growth of the organism in tissue culture proved difficult but a method has been developed. One outbreak occurred; it

was chronic and extended over several months with a few deaths each day in a flock of 6,000. Antibodies for MURRAY VALLEY ENCEPHALITIS were present in man and many wild birds in the Northern Territory. Migrating birds periodically carry the infection to man in the Murray Valley region in southern Australia.

On the shores of the lakes at the mouth of the Murray River fluke-free sheep placed on the pastures acquired infestations during the second half of the summer but from April–May onwards little further infestation was acquired. Many of the sheep acquired heavy infestations with cysticerci which caused severe liver damage. Gastro-intestinal nematode infestations in sheep reached their peak in October (spring) in April-born lambs and persisted at low levels through the summer. From early autumn infestations declined to low levels. The decline was not affected by the onset of autumn rains. Infestations were light and sheep dosed monthly with phenothiazine did not grow as well as those dosed only at weaning or those not treated. *Gongylonema verrucosum* (cattle and sheep), *Echidnophaga myrmecobii* (cat) and *Anoplocephala magna* (horse) were recorded for the first time.

The juice of *Oxalis* appeared to be less toxic than equivalent amounts of oxalic acid. Calcium carbonate given before or during the intake of oxalic acid protected sheep from poisoning. Strontium carbonate appeared to have a similar effect provided the dose of oxalic acid was not excessive. It appeared that the rumen could be "trained" to deal with large amounts of oxalic acid.

Deaths in chickens from PNEUMONIA decreased steadily from June to October. This also occurred in OMPHALITIS but the peak incidence was in the second rather than the first month after hatching. There were breed differences in the incidence of unabsorbed yolk sacs.

Among "Interesting Cases" were ovine ABORTION caused by *Listeria monocytogenees* (the owner of the sheep himself suffered an encephalitis or meningitis later but it was not possible to ascertain whether he had acquired an infection with the same organism as the sheep); HELIOTROPE POISONING caused liver damage which was followed by photosensitization; HYPOMAGNESEMIA as indicated by low serum values appeared to be widespread in sheep and cattle; horses changed suddenly from high to low roughage rations had cloudy urine containing large amount of carbonate; URICAEMIA in chickens was associated with a mortality of 25%; CANARY POX with such lesions as a large white swelling of the dorsum of the tongue killed

a number of birds (10 of 80 in one instance); an outbreak of VIBRIONIC ABORTION (*V. fetus*) in sheep resulted in death of 100 lambs in a flock of 800 ewes. PSITTACOSIS in mutton birds was studied. *R. burnetii* was isolated from wool clippings from sheep which had complement-fixing antibodies in their blood; four people who had handled the sheep suffered from the disease; antibodies were also found in blood of a few kangaroos.

The report gives details of the investigations and should be consulted in the original.

II. Trouble was experienced in the production of antigen for the c.f. test for ovine BRUCELLOSIS. Field trials showed that the disease could be transmitted from ram to ram in the absence of ewes. The intradermal test may give many false positive reactions, and the c.f. test may fail to detect an infected animal.

Pleuropneumonia-like organisms have been isolated from many cases of CHRONIC RESPIRATORY DISEASE in poultry, by culture in a simple infusion broth of pH 8 with 5% fresh yeast extract and 10% bovine serum, and with penicillin, streptomycin and thallium acetate (usually the last-named only) to control contamination.

A large number of chick embryo tissue culture systems have been tried for growth of the virus of INFECTIOUS LARYNGOTRACHEITIS. A cytopathogenic effect was noted with culture containing chorion, voluntary muscle and lung cells. Growth in Maitland type culture has shown that the virus can be passaged at least 6 times without loss of virulence or infectivity. Virulent virus was isolated from 2 outbreaks. In 3 of 4 other outbreaks the disease was chronic and indistinguishable from other forms of chronic respiratory disease, and from each a pleuropneumonia-like organism was also isolated. One strain of the virus was passaged through 5 birds without increase in virulence. All 5 birds were subsequently immune to virulent virus. Work is in progress to ascertain the role of strains of low virulence in suppressing outbreaks in South Australia. Vaccination with material from strains of low virulence has been very successful in controlling both subacute and chronic outbreaks of respiratory disease.

In observations on the seasonal occurrence of FASCIOLIASIS numerous immature parasites were found in the livers of sheep killed in March and May at one site, and from February to early May at another. Drenching with carbon tetrachloride at intervals of nine weeks in March, May and July did not prevent some losses from chronic fluke disease. Studies on the ecology of *Similimnea subaquatilis* have begun.

Further observations were made on naturally occurring CYSTICERCOSIS (*C. tenuicollis*) in sheep. Despite spectacular liver damage the sheep were apparently healthy.

Worm burdens were somewhat higher than in previous years and there was a difference of 5 lb. in weight between treated and control lambs; and no difference between the weights of lambs drenched monthly with phenothiazine and those drenched only at weaning. In another district it was concluded that parasitic disease was not the cause of the spring check to growth of lambs and that it was doubtful if any economic loss was due to internal parasitism.

Studies on the toxicity of *Oxalis pes caprae* for sheep have been concluded. Sheep grazing the plant may ingest large quantities. When fed in the laboratory 5 to 6 lb. of the plant may be eaten daily. This provides about 30 g. anhydrous oxalic acid. Much less of the pure compound when dosed to sheep will cause death. Peracute poisoning was produced by the administration of 20 g. anhydrous oxalic acid. Smaller doses over longer periods produce a slight decrease in blood calcium and uraemia occurs. Both the peracute and the acute forms were produced by ingestion of quantities of oxalic acid which were in excess relative to the calcium intake. When oxalic acid is ingested for some time in the presence of excess calcium in the diet the well-known chronic form of the disease occurs. Calcium oxalate crystals are found in the kidney and there is a chronic interstitial nephritis. In the acute condition the rumen pH falls and this in itself produces acid indigestion and anorexia. The work is being prepared for publication.

Among the more interesting material for diagnosis were: a case of TORULOSIS in a horse, with lesions apparently limited to the brain; ENCEPHALITIS in cattle with death of 13 of 19 cows due to a pasteurella infection localized in a single area of the meninges over the cerebrum; VIBRIOSIS (not identified) in young pigs with heavy mortality and lesions of pericarditis and peritonitis, the liver having a peculiar orange colour; ABORTION in ewes associated with *Corynebacterium ovis*; *Salmonella newport* in a dog and *S. derby* in a heifer. The louse, *Solenopotes capillatus* was recorded for the first time in cattle in South Australia.—H. McL. GORDON.

I. & II. AUSTRALIA. NEW SOUTH WALES. (1954 & 1955). Livestock Health and Animal Husbandry Reports No. 28 & 29. Recording the incidence of disease in stock, animal husbandry activities and research work accomplished during the years ended 30th June 1952

and 30th June 1953. [BELSCHNER, H. G.] pp. 38 & 54. Sydney: A. H. Pettifer, Govt. Printer.

1983

I. Figures are given for the incidence of TUBERCULOSIS in cattle in tubercle-free herds, and tuberculosis protected areas, and in cattle supplying raw milk to towns. The incidence is lower in these cattle than in the general cattle population, in which the infected rate ranged from 0·1 to 6·6% (18,607 cattle tested). In one herd with a number of no-visible-lesion reactors it was thought that hay may have been the sensitizing factor. There were frequent condemnations of pigs at abattoirs on account of TB. The human type tubercle bacillus has been found in pigs and is probably responsible for no-visible-lesion reactors. Avian TB. was confined to the Riverina region. Control is difficult where poultry has wide free range. Trials have begun to determine the longevity of the organism in soil. *Erysipelothrix (Listeria) monocytogenes* was recovered from poultry, probably for the first time in Australia. Strain 19 vaccination was carried out in 41,682 cattle for control of BRUCELLOSIS. Agglutination reactions after vaccination persisted longer than suggested by overseas workers. Figures are given for one herd for the numbers reacting at various intervals after vaccination. A fairly high incidence of reactors was seen in a herd of pigs where there had been considerable breeding trouble. A milking test for BRUCELLOSIS was developed using Strain 19 organisms and there has been close agreement between this test and serum agglutination tests. Cases of BLACKLEG were seen in adult cattle 4 to 5 years old and in calves as young as 2 to 3 months old. The occurrence in young calves necessitated vaccination earlier than usual and re-vaccination to reinforce immunity. Penicillin was useful in early cases.

Vaccination of ewes before lambing was not always effective in protecting lambs against ENTEROTOXAEMIA. Benedict's test for glycosuria was tried and although it proved a useful diagnostic aid it was not specific. Vaccination of goats was ineffective, even when repeated. BOTULISM was suspected in sheep which had eaten rabbit carcasses but *Clostridium botulinum* was not demonstrated.

While much of the infertility in cattle is due to BRUCELLOSIS and TRICHOMONIASIS, in many herds non-specific METRITIS is serious and in many others there is no obvious abnormality and a hormonal imbalance is suspected. One form of purulent METRITIS appears to be transmitted by the bull. Motile vibrio-like organisms have been seen in some cases but have not been definitely identified as *V. fetus*. Diagnosis of

LEPTOSPIROSIS was by examination of sections of liver and kidney, and infection of g.pigs. The organisms do not appear in large numbers in the urine of cattle until some days after cessation of haemoglobinuria and can disappear from urine rapidly unless it is preserved with 0·5% formalin immediately after collection.

After several years of almost complete freedom from BOVINE CONTAGIOUS PLEUROPNEUMONIA 11 outbreaks occurred.

Experiments with TRICHOMONIASIS showed that a cow may develop sufficient immunity from an infection to carry a calf to full term following a further service by an infected bull, thus making the disease more difficult to diagnose in herds where it has been present for some time.

Studies on the viability of the virus of MYXOMATOSIS in glycerol phosphate buffer solutions, which in 1927 had proved satisfactory, indicated that the glycerol at present available has viricidal properties. The virus is now issued to field officers in the dried state.

The Board of Tick Control activities are discussed. An arsenic resistant strain of *Boophilus microplus* has appeared in New South Wales. ITCH MITE (*Psorergates ovis*) INFESTATIONS were more prevalent than usual and the increased incidence appeared to be associated with widespread use of BHC dips instead of the usual arsenical dips. Arsenical dips control but do not eradicate *Ps. ovis*. "Fogging" with BHC was not a satisfactory treatment for ectoparasites of sheep.

Spargana were found in the muscles of feral pigs. A survey showed that practically all feral pigs examined were infested and that foxes harboured the adult *Diphyllobothrium (Spirometra) erinacei*. In infested pig carcasses kept in a freezing chamber for a week the spargana were killed. ASCARID INFESTATION was seen in calves, probably for the first time in the State. Oil of chenopodium was effective.

Metabolic disorders were common in cattle and cases which fail to respond to calcium and magnesium therapy appear to be increasing. In one instance cows grazing an oat crop showed malaise and reduced milk production with low blood magnesium and negative acetonæmia test, and the oats were negative to the nitrite test. The animals did not show symptoms typical of hypomagnesaemia and recovered after removal from the oat crop. COPPER DEFICIENCY was found in sheep on the Warrumbungle Mountains. Chronic COPPER POISONING of sheep is now being seen more frequently, probably because there are increasing amounts of subterranean clover in sown pastures. Silage was sus-

pected as a cause of ABORTION in cows. An experimentally produced case of PREGNANCY TOXAEMIA failed to respond to treatment with cortisone. It was found that sheep behaved similarly to other animals with regard to the eosinopenic response to adrenal cortical stimulation. A marked difference was noted in adrenal cortical activity during fasting between non-pregnant sheep and those in advanced pregnancy, suggesting that there is adrenal cortical involvement in PREGNANCY TOXAEMIA.

The report contains information on quarantine, operation of Acts related to animal health, nutritional work, general animal production problems and the activities of the several branches in extension and experimental work.

II. There were seven outbreaks of ANTHRAX, one involving horses and dogs. TUBERCULOSIS is a major cause of condemnation of pigs at abattoirs. The incidence is closely related to that of bovine TB. There were a large number of no-visible-lesion reactors to the tuberculin test in pigs associated with sensitivity to human type tuberculin. Further cases of avian TB. were found in Riverina districts and the first case was reported in the main egg-producing area of the State. A case was found in a wild duck. There were three cases of JOHNE'S DISEASE. BRUCELLOSIS is still the chief cause of infertility, abortion and metritis in cattle. There were some cases of UNDULANT FEVER in man. BLACKLEG occurred in cattle and sheep. 11 of 120 calves died from BLACKLEG within five days after vaccination against BOVINE CONTAGIOUS PLEUROPNEUMONIA. The calves were handled in a narrow sheep yard and considerable bruising may have occurred. In sheep outbreaks of BLACKLEG occurred following vaccination against ENTEROTOXAEMIA. There were a number of cases of acute GANGRENOUS MASTITIS and from one, *Clostridium welchii* was isolated. Other organisms associated with MASTITIS were staphylococci, coliforms and *Corynebacterium pyogenes*. ENTEROTOXAEMIA was extensive in lambs in the spring and again in the autumn. A number of outbreaks were associated with ingestion of stinkwort (*Inula graveolens*), the hairs of which may irritate the mucosa of the bowel. Contagious FOOT ROT was widespread; treatment with arsenical preparations gave favourable results but sulphadimidine and a quaternary ammonium compound were ineffective. LEPTOSPIROSIS caused a number of deaths in calves. Surveys have shown that leptospira are present in cattle in most parts of the State. *L. pomona*, *L. mitis*, *L. icterohaemorrhagiae* and *L. grippo-typosa* were identified. *L. pomona* was also found in pigs; in one instance there had been a human case associated

with the piggery and in another ABORTION had occurred in sows. The worst outbreaks of BOVINE CONTAGIOUS PLEUROPNEUMONIA for 20–30 years occurred after the introduction of infected cattle from Queensland. There were 60 outbreaks involving 8,439 cattle. A disturbing feature was the very long incubation period. Many chronic cases were found in slaughtered animals. The flocculation test did not appear to be as reliable as the usual c.f. test.

Further cases of TRICHOMONIASIS were reported. Control measures include destruction of bulls, enforced sexual rest of cows, disposal of pyometra cases which do not respond to treatment and the use of artificial insemination. The culture medium developed by Plastridge & Williams [V.B. 20, 310] for *Vibrio fetus* proved successful for *Trichomonas foetus*. Contaminants were controlled by the addition of penicillin. *Tr. foetus* is resistant to high concentrations of thallium acetate. It survives longer in culture medium than in vaginal discharge. HEXAMITIASIS was reported for the first time in two flocks of turkeys.

"WARTS" (INFECTIOUS PAPILLOMATA) on cattle were successfully treated with i/m injections of bismuth salicylate. MYXOMATOSIS continued to control rabbits but there was clear evidence that resistant strains have developed. Orchitis caused by the infection does not lead to sterility in rabbits. Recovered rabbits have not transmitted immunity to their offspring.

Hypoderma lineata and *H. bovis* larvae were found in imported cattle. The highest incidence was in cattle from the U.S.A. especially in zebu and Africander types from Texas. There were two outbreaks of TROMBIDIOSIS (*Trombicula sarcina*) in sheep on black soil areas. Partial control was obtained by the use of lime sulphur and BHC dips. The activities of the Board of Tick Control in the control and eradication of *Boophilus microplus* are described in detail. Arsenic resistant ticks were reported in the State for the first time; they were not resistant to the chlorinated insecticides.

A field trial showed that treatment of sheep affected with MYCOTIC DERMATITIS was not completely satisfactory. A 1% soln. of copper sulphate gave useful results and was more effective than 1% zinc sulphate, 0.1% formalin or a proprietary preparation, "Rusept".

One outbreak of CONTAGIOUS PUSTULAR DERMATITIS affected the skin-horn junction in rams. In another there was a concurrent infection with MYCOTIC DERMATITIS with lesions on the lips and the coronets.

Outbreaks of acute FASCIOLIASIS were

treated successfully with increased doses of carbon tetrachloride.

COPPER DEFICIENCY accompanied by "steely wool" and amelanosis in black sheep has been diagnosed in several regions. Low liver copper values, from 20 to 50 p.p.m., have been recorded in cattle in the South Coast region. Investigations are proceeding to ascertain whether a marginal copper status of this nature may be associated with infertility. Low values for liver cobalt were found in sheep in one region.

STAGGERS caused by *Malva* spp., ryegrass and *Phalaris tuberosa* occurred in sheep, and the two grasses also caused STAGGERS in cattle. ATAXIA in adult sheep was associated with eating *Tribulus terrestris* but there was no accompanying photosensitization. *Jussiaea repens* was thought to have caused the birth of dead and deformed calves. *Gleocapsa*, a primitive alga, was incriminated as a cause of mortality among sheep. YELLOW BIG HEAD in sheep was seen after ingestion of *Panicum effusum*. Other poisoning cases were associated with bracken fern, *Silybum marianum*, *Macrozamia spiralis*, and potatoes.

Cases of CORTICAL CEREBELLAR ATROPHY of lambs appeared identical with the disease as seen in Great Britain and Canada.

Observations on sheep showed that adrenocortical hormones are mainly excreted in the bile and then reabsorbed with bile salts from the intestine and thus circulated in an enterohepatic cycle. Contrary to overseas findings, estimations of 17-ketosteroids in the urine of sheep have indicated that these steroids are similar to corticosteroids in that they are not excreted in the urine.

There are notes on quarantine, meat inspection, seasonal conditions, research in animal nutrition and general accounts of the activities of the sections dealing with extension and disease investigation among the different animals and the operation of swine and Cattle Compensation Acts.—H. McL. GORDON.

AUSTRALIA. (1957). The stock inspector. Institute of Inspectors of Stock of New South Wales, Year Book 1957. pp. 103. Sydney: The Institute. 1984

Papers on the following topics are included:— ENTEROTOXAEMIA in calves; diagnosis and treatment of FOOT ROT, and the cultural requirements of *Fusiformis nodosus*; field control of BOVINE CONTAGIOUS PLEUROPNEUMONIA; differential diagnosis of INFECTIOUS LARYNGOTRACHEITIS and MUCOID TRACHEITIS; use of deldrin, aldrin and diazinon for control of ECTOPARASITES of sheep; HELMINTHOSES of

cattle; a study of mortality from FLUKE DISEASE (*Fasciola hepatica*) in sheep on irrigated land; definitive hosts of *Echinococcus granulosus* in Australia; field observations on URINARY CALCULI of wethers; PHOTOSENSITIZATION in cattle which appeared to be associated with aphis infested thistles; diseases common to turkeys and fowls in New South Wales; HAEMORRHAGIC DISEASE in chickens; INFERTILITY in dairy cattle.

—R. I. SOMMERSVILLE.

KENYA. (1956). Department of Veterinary Services Annual Report 1955. [MACOWAN, K. D. S.] pp. 143. Nairobi: Govt. Printer. Sh. 8.

1985

FOOT AND MOUTH DISEASE—The situation is that 700,000 European-owned cattle are surrounded by seven million African-owned cattle with very low standards of husbandry and control. Alum adsorbed vaccines to a value of £57,760 were imported for controlling the disease in the areas of European farming. Vaccination is entirely on a voluntary basis and tends to produce patchy immunity over these areas and to maintain smouldering infection in many districts. The disease was more widely spread at the end of 1955 than in any year since the war. There is need for compulsory powers and for the use of a cheap locally produced vaccine. This is being investigated. The infections were "O" type virus in the south and an "A" type infection in the North. The "O" type was generally more serious.

RABIES has decreased; this is attributed to mass inoculation, licensing of dogs and extermination of vermin.

The vaccine used against ENZOOTIC PNEUMONIA of sheep continued to provide protection.

The locally produced egg-adapted BOVINE CONTAGIOUS PLEUROPNEUMONIA vaccine was used on 250,881 cattle. There have been no cases for the past four years in the endemic area of Sambera. Apart from the Masai area the country remains free from the disease.

NEWCASTLE DISEASE appeared for the first time since 1941.

The incidence of TUBERCULOSIS among 88,685 bovines slaughtered in the abattoirs was only seven infected. More cases of JOHNE'S DISEASE are being reported. The complement-fixation test seems likely to offer a convenient means of diagnosis. Bulk tests of milk and cream showed in 1,666 samples 19% infected with *Brucella*. The incidence of BRUCELLOSIS varies over the districts from 12.4% at Nakuru to 38.3% at Sotik.

Cysticercus bovis infection is a serious cause of condemnation of meat. A campaign (started in 1953) in co-operation with the Medical Department had yielded only limited results. There was also an alarmingly high rate of hydatid infection in all species slaughtered.

Many surveys of TRYPARASITIASIS were undertaken. The trypanocidal drugs used were dimidium bromide, ethidium bromide, antrycide prosalt and antrycide methyl sulphate. Inoculations are now given in the dewlap to avoid damage to the skin and the meat. The intramuscular route causes necrotic lesions at the site of inoculation. When s/c inoculations are given behind the shoulder ethidium bromide causes hard plaques which damage the meat and open sores which ruin the hide.

The European areas remained free from RINDERPEST but several small outbreaks occurred in the African Reserves.

The Laboratory examined 66,943 specimens—a 25% increase on 1954 figures. There is a detailed section on the routine work of the Laboratory. The field staff inoculated 1,707,381 animals against notifiable diseases. The extensive operations in the African Pastoral areas of the Department's livestock marketing section were expanded: 37,746 cattle, 81,013 sheep and goats, and 2,330 camels were bought from Africans and sold to the Kenya Meat Commission for slaughter or for fattening or breeding on farms. This helped to relieve the overstocking in these areas.—J. A. GRIFFITHS.

BOOK REVIEWS

SEELEMANN, M. & OBIGER, G. (1958). Biologie, Klassifizierung und Nomenklatur der sog. vergrünenden Streptokokken. [Biology, classification and nomenclature of the viridans group of streptococci.] pp. 68. Nuremberg: Verlag Hans Carl. DM 5.80.

1986

This monograph is a revision and enlargement of the relevant chapter in Seeleman's book "Biologie der Streptokokken" (1954 edition).

It consists of a critical review of the literature and a report of the authors' own studies on the biology, occurrence and serological grouping of *Str. viridans*. They isolated organisms of this group from milk, tonsils of pigs and cattle, teats and vagina of goats and fibrinous pericarditis in a piglet. The presence of *Str. viridans* in milk from healthy cows may have been due to secondary contamination during collection of samples.

Five sub-species of *Str. viridans* were distinguished by their action on raffinose and inulin.

—R.M.

WEIDEL, W. (1957). Virus: die Geschichte vom geborgten Leben. [Virus—the story of borrowed life.] pp. 186. Berlin (Göttingen & Heidelberg): Springer-Verlag. DM 7.80. 1987

This little booklet, one of a series on popular science, describes in a readable and often humorous manner the biology of viruses and some of the problems of virus research. There are 27 very clear illustrations and a short index. The work is very well produced.—E.G.

ALTARA, I. (1956). Patologia aviaria e igiene degli allevamenti avicoli. [Avian pathology and the hygiene of poultry farming.] pp. xii + 701. Teramo : "Veterinaria Italiana". 1988

This work is in ten sections dealing with: the anatomy and physiology of birds; hygiene on poultry farms, disinfection and disinfestation; nutrition and nutritional diseases; organic diseases; poisoning and neoplasms; virus diseases; bacterial diseases; diseases caused by fungi and protozoa; infectious diseases; post-mortem examination of fowls, therapeutics, and administration of drugs. The book has a bibliography of 32 references and contains 265 illustrations including a number of good line drawings and photographs; it is well indexed and print, paper and binding are of high standard. It is a useful handbook.—T.E.G.R.

DODDS, C. (1957). Biochemical contributions to endocrinology. Experiments in hormonal research. pp. 76. Stanford, California: University Press. (London: Oxford University Press.) 18s. 1989

This volume records five lectures delivered at Stanford University in 1956. They are entitled:—Introduction to biochemical research in endocrinology; The study of the relation of chemical structure to oestrogenic activity; Biological activity of the oestrogens; Agricultural applications of synthetic oestrogen; and The discovery of aldosterone. The papers have been well edited to make a very readable book not requiring a deep knowledge of steroid chemistry for their enjoyment. Veterinary workers will find the fourth section (dealing with agricultural applications) a stimulating and readable account of the use of oestrogens in the animal field.

—D. S. PAPWORTH.

CRAPLET, C. (1957). Le mouton. Reproduction—alimentation—maladies. [Breeding, feeding and diseases of sheep.] pp. 298. Paris: Vigot

Frères. [2nd revised edition of "Maladies du mouton et de la chèvre".] 1990

This is an introductory text-book which will be of value to the agriculturist rather than the veterinarian.

Illustrations are infrequent. Only one of them is photographic and that is of poor quality. The line drawings illustrating the section on dystokia appear to be, in fact, representations of dystokia in cows. References are almost non-existent, apart from a list of 32 papers by various combinations of five French authors appended to the section on reproduction.

—H. SCOTT McTAGGART.

WORDEN, A. N. & LANE-PETTER, W. [Edited by.] (1957). The UFAW handbook on the care and management of laboratory animals. pp. xix + 951. London: The Universities Federation for Animal Welfare. (Distributors: E. & S. Livingstone Ltd., Edinburgh). 70s. 2nd enlarged Edit. 1991

This second edition is described as "Greatly Enlarged." This is an understatement; the earlier volume was but a shadow of this fine new book. It is well bound, well printed on good quality paper, and lavishly illustrated. It is dimensionally larger than its predecessor, and runs to 951 pages. No effort and, one imagines, no expense have been spared to convey clearly and attractively a huge amount of information on every aspect of the maintenance of those animals (mammals, birds, reptiles, amphibia, fish, worms, and insects) that contribute so much to the advancement of knowledge in the laboratories of the world.

The book is divided into two major sections. The first of these (16 chapters) deals with general considerations such as the legal protection of laboratory animals, equipment, breeding methods, nutrition, systems of recording, anaesthesia and euthanasia; the second (59 chapters) considers the various species under the broad headings:—'Rodents and Lagomorphs'; 'Insectivores'; 'Carnivores'; 'Ungulates'; 'Primates'; 'Marsupials'; 'Birds'; 'Reptiles, Amphibia and Fish'; 'Invertebrates'. Each chapter has been written by a person with expert knowledge, and the editors have achieved a uniformity of style and presentation that makes for easy and pleasurable reading.

Enthusiasm is a pleasing feature of the book. The welfare of the animal is always uppermost in the authors' minds, and there is an urgent "message" throughout that only the best is good enough. There is sympathy of a strictly practical kind, and no morbid sentimentality. Dogma is avoided, and the general tone is of the

expert giving his advice rather than of didacticism. It has been wisely recognized that there is no single perfect method of maintaining any animal, and the emphasis is on general principles rather than on specialist instruction in minute detail.

References are given at the end of each chapter. Coverage of the literature is extensive, e.g. the chapter devoted to the rabbit is supported by some 270 references. It is with regard to the references that some criticism of inaccuracy may be made; for example, numerous small errors were found among those at the end of chapter 18.

Particularly to be commended are the excellent illustrations of correct methods of handling animals in chapter 9. One illustration (in another chapter) that might well have been omitted is that on page 413 (carried over from the first edition) of an old-fashioned indoor wooden rabbit hutch—none too clean and of a type *not* recommended in the text.

The formation in Britain in 1947 of the Laboratory Animals Bureau, and of the Animal Technicians Association in 1950, was the outcome of the urgent need for healthy laboratory animals reared in the best possible surroundings. The activities of these organizations are described in two short chapters, and it is stimulating to know what has been achieved and how present problems are being tackled.

On scientific grounds this book will have interest and importance for all who work with animals, whether inside or outside laboratories, and because of its wide general appeal it will be read with profit and pleasure by many who are not scientists but who have the welfare of animals at heart.—I. H. PATTISON.

BREUER, D. (1957). Weltkatalog der veterinär-medizinischen Lehranstalten. [World catalogue of veterinary teaching establishments.] pp. 222. Hannover: Hygienischen Institut der Tierärztlichen Hochschule. 1992

This catalogue was compiled from 135 replies to a multilingual questionnaire sent to veterinary teaching establishments all over the world. Names of schools are arranged by countries, chronologically, according to the year of foundation, starting with Europe, followed by Africa, Asia, Australia and the Americas. Brief notes are given on the history of veterinary education in the countries concerned, conditions of admission, courses of study, numbers of institutes or departments, teaching personnel and students. Bibliographical references are given after each country. There is an appendix, arranged alphabetically by place names, giving name of the institution, the country, and the year of foundation. There is also a list of obsolete schools and there are numerous maps and tables. It is stated that only some of the veterinary schools in the U.S.S.R. returned the completed questionnaire and that no reply was received from those contacted in the Chinese People's Republic, Thailand, Korea, the Republic of the Philippines, Iran, Cuba and Peru and that data concerning schools in these countries are therefore incomplete.

Information about Czechoslovakia's veterinary college at Brno is taken from a French source of 17 years ago, and the other Czechoslovak veterinary school founded after the second world war at Košice has been omitted. But since no work of this scope can be completely free from omissions and inaccuracies, the value of this catalogue, which is the only book of reference of its kind, is not affected.—E.G.

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COWAN, S. T. & ROWATT, E. (Edited by) (1958). *The strategy of chemotherapy. Eighth symposium of the Society for General Microbiology held at the Royal Institution, London, April 1958.* pp. ix + 360. Cambridge: University Press. 35s.

GOERTTLER, V. (1958). Lehrbuch für Fleischbeschauer. [Ostertag's text-book for meat inspectors.] pp. viii + 811. Berlin (& Hamburg): Paul Parey. 27th Edit. DM. 35.80.

HILL, W. C. OSMAN. (1957). *Man as an animal.* pp. 176. London: Hutchinson & Co. Ltd. 10s. 6d.

SNELL, W. H. & DICK, E. A. (1957). *A glossary of mycology.* pp. xxxi + 171. Cambridge, Massachusetts: Harvard University Press. London: Oxford University Press. 40s.

TALBOT, C. D., HUNSICKER, E. R. & LI, J. (1957). *Blood and bone marrow patterns.* pp. 59. New York (& London): Grune & Stratton. \$12.00.

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ERRATA

V.B. 26, (1956), p. 573, abst. 3477, line 2. For 'formolized' read: crystal violet.

V.B. 28, abst. 245, end of para. I. For 'ilem' read: ileum.

abst. 339, title line 3. For 'cardia' read: nocardia.

abst. 498, line 1. For 'veneral' read: venereal.

abst. 657, title translation. For 'Intravenous' read: Intravenous.

abst. 1852. Abstracter's name should read: A. G. CULEY.

abst. 1962, para. 2. The second sentence should be amended to read: From these small-scale tests it appeared that fertility could not be raised significantly by enucleation of the corpus luteum on the 11th or 12th day after oestrus.

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